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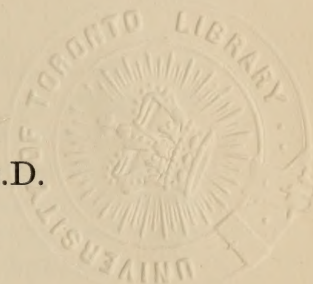


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An Inventory of the Minds of Individuals of Six and Seven Years Mental Age

BY

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CHAPTER I

INTRODUCTION

DISCUSSION OF THE PROBLEM

When one wants to find out what he has in the way of possessions he may look about and make a list of what he recognizes as his belongings. Another method would be for him to make a list of what he supposes he has and check each item as he finds the particular thing. In other words he may make an inventory or take account. He also may want to know how much or how many of each possession he has. He may even desire to place a value on some or all of them. Possibly he may desire to ascertain these facts in regard to some one else. The inventory which is to be described may be thought of in somewhat similar manner. The experimenter wanted to find out what individuals of six and seven years mental age possess or, rather, what they know.

In commencing this study it was evident from work done with children that six- and seven-year-olds know certain things. The Stanford Revision of the Binet-Simon Intelligence Tests lists specifically twenty-eight things which are known by or are within the abilities of the average six-year-old child. Observations made by various people who teach or come in close contact with children of these ages furnished many suggestions. Situations were selected or arranged for the purpose of finding out whether the six- and seven-year-old responded satisfactorily to them. Of the various items selected for presentation some lent themselves to a process of finding out how much or how many. Others permitted an estimate of value in some particular respect. In short, the inventory to be discussed consisted of a list of many items,—for the purpose of finding out what individuals of six and seven years mental age know.

It is an inventory of the minds of these individuals. The

word "mind" or "minds" might be defined in various ways. Here it is used as an inclusive term for intelligence, fund of general information, and certain manual abilities. It is quite possible that the first term—intelligence—covers the other two. Certainly one rarely finds an individual possessed of good general information without at least an average amount of intelligence. In cases where one does come upon such individuals there seems to be a marked ability for remembering detached facts,—events, names, or dates. The term intelligence certainly includes success in manual performance. It is not mere chance in every instance that permits an individual to succeed in performance. Striving for the proper result by means of adapting one's behavior and knowing that one has attained it is part of success, and depends upon intelligence. The definition of intelligence given by Binet, the quotation being taken from Dr. Terman's *The Measurement of Intelligence*, page 45, ". . . emphasized three phases of behavior: (1) the "tendency to take and maintain a definite direction; (2) the capacity to make adaptations for the purpose of attaining a desired end; and (3) the power of auto-criticism." The term "minds," therefore, will connote intelligence in its broadest interpretation.

The individuals studied cover a chronological range from approximately four years through twenty years. People sometimes express astonishment upon hearing that a certain child is only four or five years old, because "he does things like a child of six." Then again others remark that surely a certain child must be six or so because he "acts that way." Still others wonder when certain children will grow up because they always have seemed about six. A mother may tell one that she cannot allow her boy or girl of eighteen or twenty to go out-of-doors alone because he or she does not know any more than a six-year-old child. Another person tells us that somebody's "grandmother is as much care as a six-year-old and knows about as little." The case is similar in regard to the seven-year-old. People in general observe such conditions. Although the individuals in this study were not selected on the basis of the observations of people in general, the fact at least comes within the experiences of the average person that there are individuals who act like six- or seven-year-olds,—or who

know about as much or as little as six- or seven-year-olds, who are at varying chronological ages.

The title states—six and seven years mental age. The observations of the majority are based upon the behavior of the average. Thus most people have a general idea of what a six- and seven-year-old knows or can do. Theoretically as well as practically the average six-year-old has a development of mind or a mental age of six years. That is, his reactions represent the reactions of the average six-year-old. As Terman says, "Let us suppose the subject being tested is" 6 "years of age. If he goes as far in the tests as normal" 6 "year-old children ordinarily go, we can say that the child has a 'mental age' of" 6 "years, which in this case is normal (our child being" 6 "years of age). If he goes only as far as normal" 5 "year old-children ordinarily go, we say his 'mental age' is" 5 "years" It was through the process of standardizing the Binet-Simon tests that Dr. Terman arrived at the conclusion that certain responses of individuals to certain situations indicated a certain mental age. In this discussion, therefore, mental age may be understood to mean mental age as explained by Dr. Terman.

It was on the basis of the mental age findings from the Stanford Revision tests given to various individuals that the selection of subjects for this study was made. That is, numerous individuals were tested; those of six and seven years mental age were selected.

As has been suggested, people in general seem to have an idea of what six- or seven-year-olds do or ought to do. One therefore might suppose that six or seven years mental age always means one thing. If one were to spend an hour or so looking through the Terman booklets of a large clinic he doubtless would find several records of individuals with six years mental age. If he were especially interested in that age he might glance through some of these particular booklets with an air of familiarity due to confidence on his part that he knew about what six-year-olds can do. He might well be surprised to find that not all of these individuals passed successfully the identical tests: (1) Some passed all and only the tests designated as year VI. (2) Some passed the V year

group, three tests in VI, and three in VII. (3) Others passed the IV year group, two tests in V, two in VI, and two in VII. In fact, he might come upon varied combinations of successfully passed tests in these booklets of individuals with six years mental age. In the end, he would probably draw the conclusion that the reason for recording six years mental age for these particular individuals was that the total number of tests passed successfully equalled in month equivalents seventy-two—or six years. It was with this understanding that the mentally six-year-olds were selected. The same principle was followed in the selection of individuals to seven years eleven months inclusive.

These indications of irregularity in the abilities of individuals of six and seven years mental age suggested some unreliability in the mental age thus obtained. It therefore seemed best to give these individuals other tests in order to obtain, if possible, a more reliable mental age. A number of tests were given, the results of which seem to give a more complete and reliable picture of the individual's mental age.

Because of certain likenesses and differences in the results obtained from the individuals for six years no months through seven years eleven months mental age, the question arose as to the limits of six years mental age. Is it just six years, or six years to seven, or what? One way to find out is to list the things these individuals know.

The problem thus centered upon a listing of things known by, as well as of capacities for doing certain things, of individuals, children to adults, of six and seven years mental age.

REASONS FOR STUDYING THE PROBLEM

The particular choice of six and seven years mental age came from the experimenter's interest in elementary education. She wanted to find out what young children know. Certainly once a child is in school a teacher can tell what she has tried to teach the child, or what she assumes the child knows. At any rate she can enumerate certain things in organized learning to which the child has been "exposed." This is no assurance that the child has or has not succeeded in making them a part of his nervous system. The child without a doubt **learns various**

things from other sources,—from association with different children, many children, younger and older children as well as with a group of them, even before or after attending school. Consequently, a study of children who have been attending school would necessitate the drawing of very nice distinctions between, for example, pure rote memory and real ability in some particular field. Studying the child before too long a period of “exposure” to formal educational methods would eliminate some of the difficulties. It therefore seemed best to consider children upon entering school,—or stated more practically, children in the first grade. The initial interest of the experimented then centered about the mental age of children entering school.

The chronological age of school entrance is around 6 and 7. The Age-Grade Table (Strayer-Engelhardt School Record Series, Form 132) most frequently used, gives the normal age limits in the first grade as 6 to 7. The range is from 5 years 9 months to 7 years 3 months. The average is thought of as 6. From the discussion given of mental age it can be deduced that the majority of children entering school are of six years mental age. A consideration of actual numbers of children would be more convincing or more reliable than general opinion. However, it seemed more reliable to study children of 6 years 0 months through 7 years 11 months as representative of the mental age of children entering school.

The underlying desire, of course, was to find out what children know when they come to school. Such information is of prime importance to the teacher. How can she do her best work with the child until she knows what he is or what he has in the way of “tools?” In fact, what relation does the equipment which the child brings to school,—in the form of intelligence, general information, and certain responses to everyday situations—bear to the subject matter taught in Grade I? Schools have been in existence so long that one usually understands what is meant by first-grade work, or second-grade work. An aim, general or specific, is set by the school system for the grade, methods are devised, tried out, and improved, but just how specifically is the child known at the age of school entrance? In general, what relative attention has been given to these

“three sides of the triangle” in, for example, the arrangement or selection of books to be used in this grade by the teacher or pupil? If this situation is a real one in respect to the normal or average child, it certainly is worth consideration in respect to the subnormal child.

This term—subnormal—may be understood as referring to one who is below the normal in varying degrees or respects. In this study it will refer to individuals who are retarded mentally three or more years. If it is generally understood by parents that children shall enter school at age 6 or 7, one may expect to find some subnormal children in Grade I. Such children would have a mental age of 3 or 4. Assuming that the average age of Grade II is 7-8, the subnormal child in that grade might have a mental age between 4 and 5. Carrying out this particular idea on a purely theoretical basis, one would go to the third or fourth grade for subnormal children of 6 or 7 years mental age. In systems where children are passed on from grade to grade merely because legislation states that no child shall remain in the same grade more than two years, it is perfectly possible to find children of 6 to 7 years mental age in Grade IV. In fact, it frequently happens that it is the fourth grade teacher who is the first one to wake up to the actual situation that certain children in her class cannot profit from the usual school instruction. An accumulation of such cases precipitates action of one kind or another in regard to special provision for them. The study of these children of 6 or 7 years of mental age is unique in itself. One naturally would look for differences between it and a similar study of normal 6- or 7-year-olds.

As has already been stated, if the situation—taking into consideration the aim, method, and materials to be used in learning on the basis of the child's equipment—is a real one for normal and subnormal children, it should have equal if not greater attention in the case of superior children. If a school system will not admit children to school until they are 6 years old, one may find superior children in Grade I whose teachers recognize their ability to do more or better work than most of the children. There is a possibility that some superior children of 6 years may be taught at home until they seem to

need the social parts of school life and thus enter school older in chronological age and in a more advanced grade. Thus they are more than 6 years mental age upon technical entrance to school. In fact, one may think of other possibilities under intelligent school administration. However, there are many reasons which need not be discussed here for finding out what the superior child of 6 years mental age knows, whether his entrance in school is at that mental age or not.

In the present experiment, no effort was made to eliminate cases of dull, of normal, or of border-line intelligence. Such cases are included in the results. It seemed simpler to handle the results in these three units than in many units. The study thus centered in what these children know and whether or how they differ.

PREVIOUS STUDY OF PARTS OF THE PROBLEM

A certain amount of study has been given to the problem of what children know, and of how those of the same mental level differ.

Referring to G. Stanley Hall's *The Contents of Children's Minds on Entering School*, one finds on page 3 that "in October 1869 the Berlin Pedagogical Verein issued a circular inviting teachers to investigate the individuality of children on entering the city schools so far as it was represented by ideas of their environment. Individuality in children, it was said, differed in Berlin not only from that of children in smaller cities or in the country but surroundings caused marked differences in culture-capacity in different wards." Very interesting tables are given of the results of questioning 10,000 children. Many of the items refer to local experiences. References will be made to the percentages in the treatment of results in the experimenter's study.

In 1879 appeared Dr. K. Lange's *Der Vorstellungskreis unser sechsjährigen Kleinen*. This is a study of 500 children entering the city schools of Plauen and 300 entering 21 county schools in outlying districts, and, according to a quotation taken from Dr. Hall's book, it is a study

to find out whether they had seen the sun rise or set, been to a brook or in a forest, seen a shoemaker, carpenter, or mason at work, had known aught of the dear God, and so on.

Only 43 per cent of the city children had ever been to any other town or village, only 18 per cent had seen the castle near by, and knowledge of colors was as follows, beginning with those best known and ending with the least known: black, white, red, green, blue, yellow. The ignorance of city children shows the utility of school excursions. Girls had seen, heard, and experienced less than boys of all the seventeen subjects of inquiry save the "dear God" of whom they knew more than the boys.

During the fall of 1880 the experiment which furnished the data for Dr. Hall's *The Contents of Children's Minds on Entering School* was started in Boston.

All the local and many other of the German questions were not suitable to children here; and the task of selecting those that should be so, though perhaps not involving quite so many perplexing considerations as choosing an equally long list of "normal words" was by no means easy. They must not be too familiar nor too hard and remote, but must give free and easy play to thought and memory. But especially to yield more practical results, they should lie within the range of what children are commonly supposed or at least desired or expected by teachers and by those who write primary text-books and prescribe courses of instruction, to know." . . . The problem first had in mind was strictly practical; viz., what may Boston children be, by their teachers, assumed to know and have seen when they enter school.

In 1883 I. M. Greenwood, superintendent of schools of Kansas City, gave some of these questions to "678 children of the lowest primary class in that city, of whom 47 were colored . . ."

Results from these two investigations appear in tabular form in Dr. Hall's book.

From the . . . tables it seems not too much . . . to infer—I. That there is next to nothing of pedagogic value the knowledge of which it is safe to assume at the outset of school-life. Hence the need of objects and the danger of books and word cram. Hence many of the best primary teachers in Germany spend from two to four or even six months in talking of objects and drawing them before any beginning of what we till lately have regarded as primary-school work.

II. The best preparation parents can give their children for good school-training is to make them acquainted with natural objects, especially with the sights and sounds of the country, and to send them to good and hygienic, as distinct from the most fashionable, kindergartens.

III. Every teacher on starting with a new class or in a new locality to make sure that his efforts along some lines are not utterly lost, should undertake to explore carefully section by section children's minds with all the tact and ingenuity he can command and acquire, to determine exactly what is already known; and every normal-school pupil should undertake work of the same kind as an essential part of his training.

IV. The concepts that are most common in the children of a given locality are the earliest to be acquired, while the rarer ones are later. . . . This order, however, varies very greatly with every change of environment, so that the results of explorations of children's minds in one place cannot be assumed to be valid for those of another save within comparatively few concept-spheres.

Binet's studies in *L'Annee Psychologique*, 1908 and 1909, describe a different approach to the question of what children know. From the results he obtained he found that the average child of a certain age in Paris and thereabouts knew certain things, while other children of a different age knew certain other things. In fact, he organized his findings in age groups, and the entire arrangement assumed the form of tests for children. They are known as the Binet-Simon scale of intelligence tests.

The work of William Stern, *The Psychological Methods of Testing Intelligence*, which has been translated by Dr. Guy M. Whipple (1914), unites in certain respects the purposes of the studies mentioned above in his justification of well-rounded knowledge of the individual's abilities in the consideration of arranging and standardizing intelligence tests. The references made to the work of Chotzen, who studied feeble-minded individuals with 8 to 9 years mental age and varying chronological ages, are pertinent to this study and are to be utilized later. The significance to Stern of this type of work, carried on by Chotzen, is indicated in this quotation, from page 90 of his study:

When investigations of this kind shall have been carried out with a large number of feeble-minded individuals of different chronological age, we may hope to reach a far deeper insight into the whole structure of defective intelligence in its different stages of development and degrees of enfeeblement.

Several other excellent studies of children might be mentioned which have contributed to our knowledge in this field. Those referred to seem to give the most objective material for this particular study.

EVIDENCE OF USE MADE OF THE RESULTS OF THESE INVESTIGATIONS

What use has been made of the findings of these investigations of what children know? As a rule, one thinks first of

the child in his home. Is there anything in conclusions or deductions from these studies which might function in the child's daily life? If so, is it in a form which parents may use? Dr. Hall has suggested that parents make their children acquainted with natural objects. Are there any suggestions for their toys or playthings? Natural objects in diminutive size are dear to many children and are often regarded as toys. The mud puddle in a pile of soil may become to the child a pond on the side of a hill. The danger, of course, is similar to that from small illustrations. Quoting from *The Contents of Children's Minds on Entering School*, page 28,

. . . children . . . knew much by rote about a cow, its horns, butter, meat, etc., but yet were sure from the picture-book that it was no bigger than a small mouse.

Grown-ups may affirm that children of to-day have more or better toys than they had, yet this is not proof of the fact. Increased accumulations of toys in households need not have resulted in any way from the results of these studies. Still it is quite possible that child study in general has directed attention to certain factors in children's toys. Certainly books of games for little children indicate careful study of children's interests and abilities. It may be that the studies referred to and others not mentioned have been the means of stimulating interest in the study of children as children.

Story books, too, show the effect of thought being given to things children enjoy. In some of the books most popular with children the illustrations are colored, large, distinct in outline, and have the general appearance of three dimensions. The effort seems to be to meet the child on the plane of his supposed abilities.

In general, however, the experimenter has found hardly any evidence in the home of the use of the findings of the studies quoted above in children's toys, games, and story books. There is much evidence, however, that certain fundamental principles in child psychology have been followed, whether intentionally or not.

Has any use been made of the material in the school? Twenty-five elementary teachers in public and private schools in dif-

ferent districts when asked if they had read or knew *The Contents of Children's Minds on Entering School*, replied in the negative. Nevertheless, what are considered the best elementary classes or schools give innumerable evidences of intelligent application of suggestions made by authors on child study.

Has the material been in usable form? Does it meet the needs of the child? Better still, does it assist the teacher in her efforts to see that the child's needs are recognized and, as far as possible, met?

The study in Berlin in 1869 was followed by suggestions for class work. It is not known whether any "modification of the elementary curriculum" followed Dr. Lange's experiment. Dr. Hall's book gives many suggestions which have been quoted from time to time in later treatments of child study. The results of Binet's studies in revised forms are performing a greater function in the school from year to year. On a line with them are the studies of Stern which have influenced the methods of testing intelligence.

It would seem that the most far-reaching use of the results of these studies is in the measuring of children.

The measurements started with those of intelligence. Working upon the beginnings made by Binet new arrangements of tests have appeared from year to year. At the present time they are numerous. A list of tests suitable for children of the ages of this study follows, the tests used in this study being omitted. It is not arranged according to their placement upon the market, their relative values, or for any other reason than for consideration as tests for children.

1. Dearborn Group Tests of Intelligence
2. Haggerty Intelligence Examination
3. Kingsbury Primary Group Intelligence Scale
4. Meyers Mental Measure
5. Pintner Non-Language Mental Tests
6. Pintner-Cunningham Mental Tests for Beginning Grades

Just what do these tests measure? In each case the author doubtless would disagree with any firm and fast statement which did not fit in with his mental set in regard to his particular test. Considering the tests in mass they seem to contain largely measures of:

1. Knowledge, personal and general
2. Relations; parts, similarities, and opposites
3. Life situations
4. Memory
5. Form; ability to draw and identify
6. Ability to arrange pictures in a story
7. Number relations
8. Time

In a rough way these tests cover about the same abilities as the original tests of Binet. Quoting from *The Measurement of Intelligence*, page 46,

[His] approach was a many-sided one. The scale includes tests of time, orientation, of three or four kinds of memory, of apperception, of language comprehension, of knowledge about common objects, of free association, of number mastery, of constructive imagination, and of ability to compare concepts, to see contradictions, to combine fragments into a unitary whole, to comprehend abstract terms, and to meet novel situations.

A little later objective measuring turned to the field of school accomplishment. The movement may be thought of as a broad ramification of the child study commenced by the authors already referred to in the historical sketch. More specific evidences of the use of these original findings are difficult to identify. Educational measurements after certain school habits have been formed, such as doing one's own work in the midst of others, using a pencil, doing certain things to a printed page, and facility in each of these, may presume to obtain fairly satisfactory results. However, until some such habits are formed, measuring first graders or children of six years mental age is not entirely profitable, although immensely enlightening. The following educational tests are suitable for children of the mental ages indicated:

1. Scale of Attainment, Indiana University
2. Thorndike Reading Scale
3. Trabue Language Scale B
4. Writing in Thorndike Scale for Handwriting

These tests, however, were not used in this study because school accomplishments were not touched.

What were the sources for the selection of the material used in these two types of tests? Probably one source was a filtra-

tion of the original studies. The general method of finding out directly from children might be another. The observations made by teachers was doubtless one more. A trial and error method based on material from these sources must have served as the melting pot.

With certain facts in mind concerning some early efforts in child study, and particularly those which aimed to find out what children know, one's interest may narrow down naturally to what children similar in some respects know. The material of this study concerns certain findings in respect to children or individuals of approximately the same mental age.

PURPOSE OF THE STUDY

The purposes of this study—an inventory of the minds of individuals of 6 and 7 years mental age—are specifically:

1. To find out what individuals of 6 and 7 years mental age know irrespective of school knowledge or of what usually is classified as such.
2. To find out whether these individuals know the same things regardless of chronological age and intelligence quotient.

It has already been stated that any individual who when tested by the Terman tests passes successfully enough tests to total 72 units is said to have a mental age of 6 years. These individuals may be from 4 years to any age. As a matter of fact, a 20 year chronological age was selected as the upper limit. These individuals are regarded as sane, so that results are assumed to be unaffected by specific mental disorders. Of course there is no recorded difference in the I.Q. of individuals older than 16 years because, in the Terman Revision, 16 years is regarded as the upper limit of mental growth. However, attention is given to differences in all chronological ages or age groups.

3. To find out whether 6 and 7 years mental age means the same or stands for the same regardless of chronological age or I.Q.
4. To find out whether these individuals fall into marked groups in some specific respect.
5. To find out whether these individuals, if they do fall into marked groups, vary more in one group than in another.

6. To find out whether these individuals, if they do fall into marked groups, vary more in some particular test or type of tests.
7. To find out how much their fund of general information is influenced by the development, waxing and waning of certain instincts.

CHAPTER II

METHOD OF PROCEDURE

WHAT IS THE USUAL MENTAL AGE OF SCHOOL ENTRANCE?

1. In *The Survey of the Public Schools of St. Paul, 1917*, the age-grade distribution of public elementary school pupils in St. Paul, February, 1917, was 6-7 chronologically in 1B, and $6\frac{1}{2}$ - $7\frac{1}{2}$ in 1A.

2. The *Report of the Superintendent of Schools, Oakland, Cal., 1917-1918* states that the median mental age of fifty-five kindergarten children was 5 years 10 months from a range of 3 years 6 months to 7 years 10 months. Their median chronological age was 6 years 0 months in a range of 4 years 8 months to 8 years 2 months. Three hundred ninety-seven cases in the low first grade gave a median mental age of 6 years 4 months. Fourteen hundred forty-one unselected cases in the high first grade had a median mental age of 6 years 8 months.

3. Terman in *The Intelligence of School Children*, page 93, gives the standard mental age of first-grade children as 6 years 6 months to 7 years 5 months or approximately 7 years.

4. Quoting from *The Baltimore School Survey, 1920-21*, Volume 2, page 155: "If a child enters public school at six years of age or before he is seven and makes normal progress (in other words, makes one grade each year) he may be said to be of normal age. . . ."

From these four sources of data it is evident that there are slight differences in the results obtained in the actual study of the age of children in the first grade. It is, however, quite evident that the age deviates around 7 years. The fact that this represents the average age permits one to assume, on the basis of unselection, that it is also about the average mental age.

In drawing such a conclusion one naturally keeps in mind the possibilities of strong selective factors. Is it possible that selection did play a weighty part in the results just presented?

For comparison a study was made of selected groups of children in and about New York City with the following results. [See Table I, page 17.]

1. Seventy-nine cases in Horace Mann Kindergarten gave a median mental age of 5 years 11.8 months from a range of 3 years 2 months to 7 years 6 months. These cases are not all of one year's testing but represent the entrance Terman tests for three to four years. (Whether the median mental age of entrance has fluctuated markedly within the entire period was not estimated.) See Table I for details.

2. Two hundred and one cases of Horace Mann Grade I children, 1916, '17, '18, '19 and '20, showed a median mental age of 7 years 3.6 months. The range was from 4 years 8 months to 10 years 6 months.

3. Fourteen cases from Scarboro School Grade I, 1920, gave a median mental age 6 years 11.5 months from a range of 5 years 4 months to 8 years 4 months.

4. The Lincoln School Grade I median mental age of 43 cases in 1920 was 7 years 6.4 months. In this instance all the mental ages were computed as though all the children had been tested on one date, the assumption being that the intelligence quotient is fairly constant and that a child with an I.Q. of .80 progresses at the rate of .80 a year.

5. The first grade in Public School 64, Manhattan, for 200 cases of 1918, '19, '20, and up to February, 1921, showed a median mental age of 6 years 4.6 months.

6. From actual teaching in public school classes for mentally deficient children it seemed to the experimenter that the median mental age would be somewhere around that of first or second grade children. A study was made of 1,000 cases taken from the files of the Ungraded Classes, New York City, commencing with September, 1920, according to successive numbering based on date and order of examination. Many cases were discarded for one reason or another before 1,000 were finally accumulated, so that it seems as though there could not be any one strong selective element from the point of view of choice. The median mental age is 6 years 7.7 months and the range is from 3 years 0 months to 10 years 6 months.

Whether the cases are highly selected or not the average

TABLE I
AGES OF CHILDREN UPON ENTERING SCHOOL

School	No.		Median	Mean	Sigma	P.E.
Horace Mann Kindergarten	79	M.A.	6 yr. 5.5 mo.	6 yr. 5.2 mo.	6.1 mo.	4.1 mo.
		C.A.	5 yr. 3.5 mo.	5 yr. 2 mo.	5.2 mo.	3.5 mo.
		I.Q.	123.8	124.2	14.4	9.7
Horace Mann Grade I	201	M.A.	7 yr. 3.6 mo.	7 yr. 3.6 mo.	11.3 mo.	7.6 mo.
		C.A.	6 yr. 6.3 mo.	6 yr. 5.1 mo.	8.6 mo.	5.8 mo.
		I.Q.	114.4	115.6	12.7	8.6
Scarboro Grade I	14	M.A.	6 yr. 11.5 mo.	7 yr. 9 mo.	10.4 mo.	7.0 mo.
		C.A.	6 yr. 2.5 mo.	6 yr. 6 mo.	7.1 mo.	4.8 mo.
		I.Q.	120		11.3	7.6
Lincoln Grade I	43	M.A.	7 yr. 6.4 mo.	7 yr. 8.9 mo.	1 yr.	8.1 mo.
		C.A.	6 yr. 10.3 mo.	6 yr. 9.8 mo.	8.4 mo.	5.7 mo.
		I.Q.	115.4	117.8	12.8	8.6
P. S. 64 Grade I	200	M.A.	6 yr. 3.1 mo.	6 yr. 1.7 mo.	9.4 mo.	6.3 mo.
		C.A.	6 yr. 5.2 mo.	6 yr. 6.5 mo.	5.8 mo.	3.9 mo.
		I.Q.	95.9	95	12.8	8.6

The table reads: There are 79 individuals of the Horace Mann Kindergarten. The median of their mental ages is 6 years 5.5 months, of their chronological ages 5 years 3.5 months, and of their intelligence quotients 123.8. The mean or averages in these three respects are 6 years 5.2 months, 5 years 2 months, and 124.2. The sigma and deviation is 6.1 months, 5.2 months, and 14.4 points, with a P. E. (variability of the deviation) of 4.1 months, 3.5 months, and 9.7 points.

TABLE II
AGES OF CHILDREN UPON ENTERING UNGRADED CLASSES

School	No.		Median	Mean	Sigma	P.E.
P. S. 64 Ungraded	200	M.A.	6 yr. 4.6 mo.	6 yr. 4.4 mo.	1 yr. 9.7 mo.	1 yr. 2.6 mo.
		C.A.	9 yr. 3.8 mo.	9 yr. 6.4 mo.	10.1 mo.	6.8 mo.
		I.Q.	67.4	68.3	12.2	8.2
Ungraded Classes (N. Y. C.)	1000	M.A.	6 yr. 7.7 mo.	7 yr. 1.3 mo.	1 yr. 5.1 mo.	1 yr. 0.2 mo.
		C.A.	11 y. 10.4 mo.	10 yr. 1.8 mo.	2 yr. 4.7 mo.	1 yr. 7.4 mo.
		I.Q.	64.6	64.3	8.1	5.5

The table reads similarly to Table I.

mental age at entrance (meaning entrance to Grade I) is somewhere between 6 and 7. (See Tables I, II, page 17.)

On the basis of these findings it was concluded that 6 years mental age would not be too high an age at which to commence the study. The selection, however, was to cover the mental ages from 6 years 0 months through 6 years 11 months. As a matter of fact, children through 7 years 11 months were included because of certain supposedly unreliable elements or factors.

The study therefore concerns individuals of 6 and 7 years mental age, of which the former are more numerous.

SOURCES FOR SELECTION OF CHILDREN FOR THE INVENTORY

It was desirable of course to obtain a random selection of individuals and plans were made to test children in (1) public schools, country and city; (2) non-public schools, parochial, orphanages, schools of formal or informal organization; (3) state institutions, Bedford Hills, Hudson, Newark, N. Y., Vineland, N. J., Elmira, and other institutions for delinquents, the deteriorated, or the insane. It soon became evident that the results from testing the individuals in certain of these schools would be representative of a group highly selected in some particular respect and that the results in themselves would furnish material for varied problems. It was therefore decided to seek 6- and 7-year-olds, by mental age, who were subnormal, normal, or superior.

PRELIMINARY SELECTION OF CHILDREN BY MEANS OF STANFORD REVISION (BINET-SIMON) TESTS

The study was commenced with the children at Letchworth Village, a New York State School for Feeble-Minded Children. The greatest number of children come from New York, Westchester, Kings, and Orange counties in order of decreasing numbers. New York County sends nearly one-third of the children. Less than one-twentieth come from any other one county.

The children had been in Letchworth from 6 months to 5 years. All of them said they had been to school previously, but it was not always possible to verify their statements. A large percentage had weekly if not daily contact with the school (Stewart Hall). Some went to school mornings for academic

work and to the work shops for manual activities in the afternoon. Some came in for gymnasium work once or twice a week. The work in the academic classes ranged from kindergarten through fourth grade and averaged second grade. The files did not state in every case the child's school progress or record before commitment, but there were few cases where any grade was indicated above the fourth.

The work of testing began with the children in the school. The Stanford Revision was given first. From those tested all with mental ages from 6 years 0 months to 7 years 11 months inclusive were selected. After eliminating for various reasons, the actual number for study was 367. The results of the inventory, however, are in regard to only 312.

Although children were found with I.Q.'s of over .70, technically only those of .70 or below are regarded as subnormal in this study, Terman's classification of I.Q.'s being the basis of discrimination. According to I.Q.'s the number of children in each group is as follows:

I. Q.	No. of Children
- .50	149
.51- .60 {	175
.61- .70 {	
.71- .80	33
.81- .90	9
.91-1.00	1

One immediately judges that there is a wide range of chronological ages. The numbers of children or individuals on this age basis are:

Age	No. of Children
- 6	0
6-10	81
11-15	204
16-20	82

See Tables III, IV, V for final basis of study.

The term "children" is used indiscriminately for all the individuals in this study, despite the fact that some were twenty years of age. Mentally they may well be called children.

The second part of the study was carried on at Public School 43, Manhattan. Terman tests were given to first and second grade children. Two hundred with mental ages from 6 years 0 months through 7 years 11 months were selected chiefly from four first grades and one low second. Their distributions according to chronological ages and I.Q. are given below:

Chron. Age	No. of Children	I. Q.	No. of Children
-6	1	.71- .80	4
6-10	199	.81- .90	36
11-15	0	.91-1.00 }	141
		1.01-1.10 }	
		1.11-1.20	18
		1.21-1.30	1

The third part of the study, dealing with superior children, was carried on with children of the Horace Mann Kindergarten. Forty children were tested. Their chronological ages and I. Q. are:

Chron. Age	No. of Children	I. Q.	No. of Children
4- 5 }	36	.81- .90	0
5- 6 } .....		.91-1.00 }	9
6- 7	4	1.01-1.10 }	
		1.11-1.20	9
		1.21-1.30	12
		1.31-1.40	8
		1.41-1.50	2
		1.51-1.60	0

The total number of the children studied in this experiment, whether studied in all respects or in only a few, is given in the following tables, Table III according to chronological age, Table V according to I.Q. The mental age table (Table IV) gives the number of children in each of these three groups in units of six months mental age.

The preliminary selection of children was by means of the Stanford Revision of the Binet-Simon tests. From Table V it is evident that the distribution of individuals does not follow the normal curve of individuals selected at random. The numbers at the lower end far outweigh those in the normal or superior

TABLE III
CHRONOLOGICAL AGES OF INDIVIDUALS STUDIED

Group	Age -6	Age 6-10	Age 11-15	Age 16-20	Total
Letchworth	0	70	174	68	312
P. S. 43	1	199	0	0	200
Horace Mann	36	4	0	0	40
Total	37	273	174	68	552

The table reads: There were no individuals of less than 6 years chronological age studied at Letchworth. Of the 312 given the inventory, 70 were from 6 to 20 years of age (inclusive), 174 from 11 to 15, and 68 from 16 to 20, etc.

TABLE IV
MENTAL AGES OF INDIVIDUALS STUDIED

Group	Age 6 ⁰ -6 ⁵	Age 6 ⁶ -6 ¹¹	Age 7 ⁰ -7 ⁵	Age 7 ⁶ -7 ¹¹	Total
Letchworth	103	158	37	14	312
P. S. 43	58	87	49	6	200
Horace Mann	15	13	10	2	40
Total	176	258	96	22	552

These mental ages are derived according to the criterion described on page 33, which is not merely the mental age obtained from the Stanford Revision, but an average of that mental age and the findings of the Herring Revision of the Binet-Simon tests, plus a number of months depending upon the interval between the giving of the Stanford and the Herring (which was the final measure of intelligence) and the intelligence quotient derived from the Terman test.

TABLE V
INTELLIGENCE QUOTIENTS OF INDIVIDUALS STUDIED

Group	I.Q. -50	I.Q. 51-70	I.Q. 71-80	I.Q. 81-90	I.Q. 91-110	I.Q. 111-120	I.Q. 121-130	I.Q. 131-140	I.Q. 141-	Total
Letchworth	135	145	22	9	1	0	0	0	0	354
P. S. 43	0	0	4	36	141	18	1	0	0	200
Horace Mann	0	0	0	0	9	9	12	8	2	40
Total	135	145	26	45	151	27	13	8	2	594

The table reads: Of 354 Letchworth individuals studied, 135 had an intelligence quotient of less than .50, 145 of .51-.70, 22 of .71-.80, 9 of .81-.90, and 1 of .91-1.10. Of the children from P. S. 43, Manhattan, 4 had an I. Q. of .71-.80, 36 of .81-.90, etc. The criterion mental age was used in the derivation.

group. It was not the intention of the experimenter to select distinct groups, and compare group 1 with 2, 1 with 3, and 2 with 3. An effort was made to have, if possible, an even distribution, and then to see if the individuals fell into distinct groups.

It might appear that this is a study of results obtained from work with feeble-minded children for comparison with results from more intelligent children. The discrepancy of numbers was the result of circumstances. Time, opportunity, and facilities made possible a detailed study of individuals of 6 years or more of mental age at Letchworth Village. These three factors did not permit so complete a study of the children at Public School 43, and still less for study of the superior child. A detailed study of the last group would have been more satisfactory.

TESTS FOR MORE ACCURATE DETERMINATION OF MENTAL AGE

Although children in general are promoted or put into special classes on the basis of the findings of the Terman tests only, it was felt that the finding of one intelligence test was not reliable enough for one to say positively that a certain child had such a mental age. It is true that on the basis of the findings of the test given on a certain day, the number of tests passed successfully totaled seventy-two or more months—through ninety-five. However, one measure of a thing or quality seems unreliable. The child may or may not have done his best. The experimenter may or may not have given him enough time. The test may have been interrupted. There may have been numerous disturbing factors. Then, too, some of the children had had the Terman tests before. In many clinics to which children are taken for the first time because (1) they cannot learn, (2) cannot be trusted out alone, because they run away or cannot find their way home, (3) cannot do errands, or (4) are called names or are "picked on" by other children, an intelligence test very often is given. The results may have been used as part of the committent procedure, incorporated in the form, accepted by the court, as at least partial evidence and confirmation of the reasons for the legal action. In some cases children were examined and enrolled in public school classes for mentally deficient children.

Later, circumstances might have necessitated some decision from the court and a second examination or test would be used in the evidence. A third chance for some of the children to have had the test occurred when the family wished to take the child away permanently from the institution so that it would be entirely free from the control of the institution, or for case studies of some special type such as the endocrin. Thus, in practically all cases except possibly in some commitments by the superintendent of the poor, the children at Letchworth had had one Terman test. Some had had the test twice, and some three times. The testing by the experimenter in some instances was the fourth the individual had had. The repetition, the element of practice, might affect the results in total number of months. Comparison of the actual test records, whenever it was possible, showed in a few cases gains in ability to count thirteen pennies (VI 3), to count backwards (VIII 2), to tell the day, month, day of the month, and year (IX), and to draw designs from memory (X 3). One boy when shown the last test named (X 3) said, "Oh! I can do that. I've had it before," and drew the designs from memory correctly. Mention of successful passing of these tests instantly suggests irregularity in the things these individuals can do.

It was also believed that merely years of living, of experiencing years of life, affected the test (Stanford) results. In the case of naming the coins (VI 5) it is quite possible that some of the older individuals committed after twelve or more years of age might have handled money before coming to Letchworth. Some of the younger children might have been committed before they were old enough to have experience with any piece of money but the penny. Once in the institution their contact with nickels, dimes, and quarters was limited.

Besides the three elements of (1) the unreliability of one test, (2) the effect of practice from one or more repetitions of the test, and (3) the influence of experience upon ability to pass certain tests, there was as fourth, (4) a possibility of development during the period of making the inventory. It was not known ahead of time just how long a period might have to elapse between the giving of the Terman test and of the final test. The children might be ill, or various kinds of inter-

ruptions might occur. Mental growth might take place during the interim, and this possibility had to be kept in mind. It was assumed that if the period between the first and last test were not over four months at the most, those children with I.Q.'s below .70 would have gained but a small amount in mental age. The normal child certainly would have gained some, and without a doubt the superior child would have gained some. On the assumption that the mental age of a child with an I.Q. of .80 increases at the rate of .80 a year, the amount of gain in each case was estimable theoretically. In only a few cases of the subnormal child was the length of time so great as to necessitate a consideration of mental growth. In the other cases, those of the normal and superior children, this possibility of growth was duly regarded.

On the whole, it seemed best to give other tests for greater reliability of mental age. By doing so capacities might be revealed or measured which apparently were untouched by the Terman test. The following tests were selected:

1. Army Beta
2. Pintner Mental Survey (not *in toto*)
3. Pressey Primer
4. Thorndike Non-Verbal

From the Pintner series of six tests,—Word Building, Memory, Cancellation, Digit-Symbol, Symbol-Digit, and Opposites—the first two were omitted because the experimenter wished to find out what these individuals of 6 and 7 years mental age know exclusive or independent of school knowledge. It may appear that some of the material included in the inventory is school knowledge or is dependent upon it. However, it would be possible in these cases for acquisition of the desired information or knowledge to have taken place without formal instruction. Such a test is word building: From the point of view of formal instruction it requires at least ability to recognize letters, to spell, to arrange letters into words, and also at least a knowledge of spelling and writing. It seems as though success in these two tests does depend to a large extent upon school knowledge, and, in fact, too much so for them to come within the plan of this study. Cancellation, the Digit-Symbol, and Symbol-Digit tests certainly require among other things

some ability in recognizing, or identifying, or reproducing certain symbols and ability to use the pencil. These accomplishments many children seem to "pick up" by themselves before going to school. For the same general reasons the Opposites test was not given according to the standard directions. The examiner gave it to each child verbally and recorded the responses. Possibly the length of time between the uttering of the consecutive stimulus words was greater than that between the looking at or the reading of the stimulus words in the standardized procedure. Any marked difference in the score due to this change would be supposedly in the child's favor. The increasing difficulty of the test, however, might easily take care of a part of this difference.

These four tests were given to 345 children at Letchworth and to 200 children at Public School 43, in the same relative order, and with the same number of days in between. In the case of the Letchworth children not all had been previously given the Terman test, so a selection was made on the basis of the mental ages on the commitment papers, school records, and in some cases a teacher's opinion and the experimenter's observation. Few of the children selected in this way tested less than 6 years 0 months, or more than 7 years 11 months. In the case of the Public School 43 children, the Terman testing was nearly completed before the group tests were given and the close grading of the first-year pupils along with other considerations facilitated a reasonable selection.

A great many individual tests were considered for the study. A number of them when tried out presented difficulties in successful administering, recording, and evaluating, and were abandoned. The following tests were finally selected:

5. Completion B (described in Pintner and Patterson, *A Scale of Performance Tests*)
6. Goodenough's Drawing of a Man
7. Healy-Fernald "A" (appears as X alternate in Stanford Revision)
8. Healy Pictorial Completion (II)
9. Herring alternate for the Terman Revision
10. Knox Cube Imitation
11. Mare and Foal

12. Kohs' Design test

13. Pyle—Part-Whole

(This is another test that was not given according to the author's directions. Just as in the Opposites test the examiner read the words and recorded the responses.)

14. Picture Arrangement (described in Yerkes and Yoakum, *Army Mental Tests*)

15. Porteus Mazes

An effort was made to give these tests in about the same order, but it was not possible to give them after identical intervals. They were scattered through the giving of the inventory.

ORGANIZATION OF THE INVENTORY

In organizing the material for the inventory the chief aim was to select material from as many fields as possible within the experience of children. Many suggestions came from (1) Hall's *Contents of Children's Minds on Entering School*, (2) Thorndike's *Notes on Child Study*, (3) discussions of children's needs, (4) teachers' observations, as well as from (5) general conversation with children of varying mental levels.

Once a large amount of material was accumulated it was necessary to put the separate parts of the inventory in some form that would produce a desirable or pertinent response, preferably in simple words. Some were arranged in the form of (1) a request: "Tell me ———," (2) a question, or (3) "I'll say ——— and you tell me ———" as a means of checking. Then, too, care was taken to guard against the factor of suggestion. Not only in the wording of the questions and in the order of presenting questions or performance tests, but even in the placement of the material to be used, many changes were necessary before a desirable system was established. For example, a child was given these instructions, "Take the color you like best. Make me a square." Previous to the child's coming to the place of experimenting two sets of wax crayons, exact duplicates, of red, yellow, orange, green, blue, violet, brown, and black were placed in the tin box which had contained one set. The second set was placed in the cover and there was no appreciable difference in the two parts of the box which were closely hinged together. The crayons lay in the

box in this fashion—!!!!!!!. It was observed that crayons were selected from the left-hand part in preference to the right. Further observation revealed the fact that the crayons were usually picked out of the box from the top edge. When an individual attempted to pick up a crayon from the right-hand part he often fumbled. After that he took from the left. Sometimes the attempt was abandoned and the same color was taken from the other side. One difficulty appeared to be due to the small area for grasping in the case of the crayons that were in the right-hand side (these were pointing away from the examiner) and the sizeable area on the ends of those on the left side (they pointed toward the child). When all the crayons pointed toward the child there was no predominance of selection from one side.

The final arrangement of the inventory was the result of trial and error with two or three tentative forms.

The inventory began with personal and familiar items and progressed with relatively more and more impersonal and abstract ones. There was no attempt to have steps of equal difficulty or parts of increasing difficulty. It is not a scale. Performances were scattered here and there. An effort was made to alternate difficult and abstract material with less difficult. The children spoke of it as "Some work and then some games, and then some more work and some more games." To avoid fatigue in one respect variety was introduced. Likewise in the matter of interest, material which gave the individual opportunities to express himself freely were scattered along. General conversation was not discouraged but redirected to some allied material which in some cases was out of the regular order but gave evidence of being productive at that moment. The entire contents of the inventory will be treated more fully on pages 47-97, but the items are not listed necessarily in the order presented to the individuals.

The fields which the inventory covers or the types of information it sought to study are listed below. The classification may well be questioned as vague or overlapping. Certain parts do overlap, and some might be classified under two or more headings. The arrangement is merely to present a general idea of the scope of the work. The conclusions have been drawn from

responses to items grouped in this manner without some explanation of or justification for the peculiar procedure.

ANALYSIS OF THE INVENTORY

A rough analysis of the inventory shows the following:

1. Personal information
2. General information
3. Knowledge of parts
4. Life situations
5. Identification of the concrete and abstract in picture post cards.
6. Free association of words
7. Memory
 - a. Auditory
 - 1) Related words
 - 2) Unrelated words
 - 3) Nonsense syllables
 - 4) Digits
 - 5) Rhythm
 - b. Visual
 - 1) Objects
8. Color
 - a. Choice
 - b. Preference
 - c. Consistency of preference
9. Form
 - a. Ability to draw geometric forms
 - b. Ability to identify geometric forms
10. Drawing
 - a. Boy, girl, dog
 - b. Man, house, wagon, barn
11. Arrangement of pictures (to represent a story)
12. Rhythms
 - a. Auditory
 - b. Visual-kinaesthetic
13. Description of pictures
14. Origins
15. Comprehension of social or moral situations
16. Number
17. Time
18. Orientation
 - a. Time
 - b. Place
 - c. Direction
 - d. Distance
19. Vocabulary
20. Performance

SUMMARY OF METHOD OF PROCEDURE FOR THE ENTIRE STUDY .

The method of procedure so far has been presented in parts. In a body it is as follows: The individuals were selected by the Stanford Revision of the Binet-Simon tests. Group testing was carried on with the individuals at Letchworth Village and Public School 43, but not with the Horace Mann Kindergarten children. The inventory was given in full to the first two groups, and only in part to the third. The work was carried on wherever there was available and quiet space—in wards, reception rooms, hallways, or unoccupied class rooms. The questioning was done in relatively small fragments, at a time depending upon the chronological age of the individual, the time of day, the amount of available time before a natural break in the usual occupations of the day, as well as the amount of interest shown by the examinee. As the work progressed the Herring Alternate became the final measurement of mental age. Recording was relatively simple because of care taken in the wording of the parts of the inventory. (See Tables IX, X, XI for data.)

CHAPTER III

TREATMENT OF RESULTS

As has been stated, the mental age obtained from one testing did not seem reliable. Other tests were given for supposed increase in reliability, and for inclusion of other abilities apparently untouched by the Stanford Revision. An aggregation of scores from several tests might suggest some method of averaging, or deriving a score from a composite. The scores in certain tests, such as the Army Beta and Thorndike Non-Verbal,—in fact, in most of the non-language or non-verbal tests,—showed such variability that merely averaging raw scores seemed out of reason. A wide and high range was secured from Letchworth and a narrow and very low range from Public School 43. A second way of treating the results would be to find the difference between the score of each child other than normal, that is, of a subnormal or superior child, in any test, and the median for an ordinary or normal child of the same age, and transmute it into positive or negative multiples of the probable error as the case required. The possibilities of this method of treating the results were seriously considered. It was found that a number of the tests were without standardized norms. The norms of some were not usable in the form offered. Then, too, norms for the years 6 and 7 were for the most part meager, and were derived from small numbers of individuals. Although the study itself includes 200 normal children in round numbers the results from the point of view of the factors that make for reliable norms do not justify regarding them (the norms) as such. The individuals were selected because of their specific mental ages, and consequently their responses may or may not be representative of those mental ages only. The tests were given at the beginning of the fall term and many of the children experience difficulty in handling the pencil as well as finding or keeping the place on the test blank. Altogether the reliability of such procedure seemed doubtful in its applicability

to the material to be worked up. If the material were to be studied from the point of view of native and environmental factors one might match the score or mental age of a young bright six- or seven-year-old (mentally) with that of an old, dull individual of "equivalent" mental age. No attempt was made to treat the results in this manner because the immediate problem was not directly concerned with the factors mentioned above. The material, however, lends itself to such a method of treatment and study. Weighting of scores might serve as a fourth possibility. In this case one may desire to know first how various tests correlate with respect to some one test or with each other.

The correlations mentioned below are of indicated tests and the Stanford Revision.

1. Varied correlations have been obtained by users of the Army Beta. They range around .73 and .75. "The content in the Beta examination was chosen primarily for high correlations with intellect as tested by the ordinary verbal forms of examination, such as the Stanford-Binet or the Army Alpha examination." (*Journal of Applied Psychology*, Vol. III, p. 199-214, Sept., 1919.)

2. The Dearborn Group Tests of Intelligence likewise vary in the correlations obtained with the Stanford, ranging from .36 to .87. Median correlations of five rooms of IA and IB gave .54 and .62 respectively.

3. Haggerty Intelligence Examination, Delta I, correlates between .13 and .77 in the case of first grade children. This variability is remarkable because of poor results from this test when given to children just entering school,—and better results if given in the middle of the year when the children have formed certain habits which lend a bit of familiarity, as it were, to the taking of the test.

4. The Herring Revision of the Binet-Simon Tests has a correlation of .9908, P.E. .001, from 82 cases of Stanford Revision tests. The probable error of estimate of the examination is 2.37 points in I.Q.

5. Kingsbury Primary Group Intelligence Scale, Form A, varies in its correlations from .42 to .82.

6. Kohs' Block Design test has a correlation of .81, P.E.±.01

from 291 public school cases, and .67, P.E. \pm .05 from 75 feeble-minded cases.

7. Meyers Mental Measure correlates from .65 to .80.

8. The correlations of the Otis Group Intelligence Scale are from .00 (in the case of 13 children) to .75 with IA and IB children.

9. Pintner's Non-Language Group Intelligence Test shows the following relation to the Stanford: "The correlation between the I.Q. on the Stanford and the percentile rank on these tests is .66." (*Journal of Applied Psychology*, Vol. III, pp. 199-214, Sept., 1919.)

A correlation of .78 has been obtained for this test since the date of this publication.

10. Porteus Mazes has a correlation of .21, P.E. .119 with the Stanford.

11. The Pressey Primer Scale has a correlation between .58 and .75.

12. The Thorndike Non-Verbal Test, described under "A Standardized Group Examination of Intelligence Independent of Language" in the *Journal of Applied Psychology*, just noted, states, on page 14, "The content in the . . . examination was chosen primarily for high correlation with intellect as employed in managing both things and words. The examination is intended for use as a supplement to standard tests of verbal intelligence."

13. The correlation of the Yerkes-Bridges Scale quoted from *A Study of Women Delinquents in New York State* is .87 with the Stanford Revision.

It is evident that variability is possible in correlations. It seems as though the correlations must have been based on groups which were highly selected or very small. At least one does not count on finding a difference of .50 or more in correlations from tests given to large enough numbers of children selected at random.

The correlations obtained in this study vary a great deal from some just stated. By recalling the relative numbers in the groups of normal and subnormal children and their group distributions a possible reason for the apparently bizarre correlations comes to mind. The criterion used is not merely the

mental age obtained for the Stanford Revision, but is the Stanford mental age plus the findings of the Herring Revision, plus a number of months depending upon the interval between the giving of the Stanford and the Herring, and the I.Q., divided by 2. No results have been given for Completion "B," Healy-Fernald "A," Mare and Foal, and the Picture Arrangement. They were given only to the children at Letchworth. They appear not to contribute materially to this part of the study, and in fact no further mention is made of them.

TABLE VI
CORRELATIONS OF TESTS USED IN REGRESSIONS
(427 cases)

	Criterion	Army Beta	Pintner	Pressey	Thorndike Non-Verbal
Criterion	1.0000	.3850	.5080	.5750	.4690
Army Beta	.3850	1.0000	.2487	.3890	.2080
Pintner	.5080	.2487	1.0000	.4452	.6800
Pressey	.5750	.3890	.4452	1.0000	.3370
T. Non-Verbal	.4690	.2080	.6800	.3370	1.0000

TABLE VII
INTERCORRELATIONS OF TESTS

	No. of Cases	Criterion	Healy	Knox	Kohs	Part-Whole	Porteus Mazes
Criterion	427	1.000	.463	.339	.4405	.12	.167
Healy	227	.463	1.000	—	—	.133	—
Knox	427	.339	—	1.000	.175	.09	.128
Kohs	427	.4405	—	.175	1.000	—	.205
Part-Whole	427	.12	.12	.09	—	1.000	.193
Porteus Mazes	427	.167	—	.128	.205	.193	1.000
Goodenough	150	.45	—	—	—	—	—
Army Beta	427	.3850	.356	.167	.09	.0422	.123
Pintner	427	.5080	—	.05	.341	.334	.232
Pressey	427	.4690	—	.11	.284	.317	.173
Thorndike	427	.5750	.4054	.286	.343	.278	.153

The relations and interrelations shown in Tables VI and VII are food for thought. (1) In general, if the results of each group, the Letchworth and Public School 43, were correlated separately there would be a higher correlation in the case of the

former and a lower correlation in the case of the latter. (2) Tests dependent upon maturity or experience factors give "better" results than those measuring intelligence *per se*, probably because those of greater chronological age made so very much higher scores than the normal group. The interrelations bear out these probabilities. With the average mental age as the criterion there is evidence enough for weighting the results obtained.

However, before the correlations were worked out psychologists experienced in the giving and evaluating of tests were asked to weight the separate tests in this study. The average of the weights they indicated is Army Beta 3, Pintner (Cancellation, Digit-Symbol, Opposites, Symbol-Digit) 2, Pressey Primer 5, and Thorndike Non-Verbal 3, when these tests only are given. A number of the remaining tests lend themselves so inadequately to comparison that the exact weight was not decided. A rough estimate of the weights is 6 for each of the performance tests. In assigning the values the bases, in general, were length of time required for the test and verbalness and abstractness of functions involved.

To obtain further assurance for weighting, the scores obtained in the various tests were distributed according to mental age: 6 years—6 years 11 months, and 7 years—7 years 11 months. The value of *Q* was found in each distribution. On this basis the following weights were assigned: Army Beta 3, Pintner 2, Pressey 1, Thorndike Non-Verbal 3, Cancellation 2, Digit-Symbol 6, Opposites 6, Part-Whole 4, Symbol-Digit 6, Knox Cube Imitation 6, Kohs' Block Design 4, and Porteus Mazes 10.

In justification of this procedure the percentage of overlapping was obtained. From Table VIII it is readily seen that in this selection of individuals there is slight differentiation between the mental ages. A detailed study of the test scores and especially of the scores in the separate parts brings to light evidences of the effect of experience. Many causes are operating to produce this insufficient or inadequate discrimination. Consequently, the percentages of overlapping when compared with the correlations were not regarded as reliable sources of prophesying the proper weights.

Weighting on the basis of regressions was then considered.

TABLE VIII
PERCENTAGE OF OVERLAPPING IN THE TESTS

Name of Test	No. of Cases	Mental Age 6°-6 ¹¹				Mental Age 7°-7 ¹¹				Per Cent
		M.	Q. ¹	Q. ²	Q.	M.	Q. ¹		Q.	Overlapping
Army Beta	520	16	9	26	8.5	26	21	32	5.5	24.00
Pintner Combined Score	540	13	8	18	5	27	17	38	10.5	.08
Pressey Primer	518	20	9	37	14	47	36	60	12	11.56
Thorndike Non-Verbal	519	4	2	8	3	11	4	20	8	10.26
Cancellation	553	4	0	9	4.5	16	5	22	8.5	10.24
Digit-Symbol	545	0	0	2	1	3	2	6	2	14.48
Symbol-Digit	552	3	2	4	1	5	3	6	1.5	6.13
Opposites	551	2	2	4	1	4	2	7	2.5	22.63
Part-Whole	552	4	2	5	1.5	6	3	9	3	18.10
Healy Picture Completion	351	2	-7	13	10	21	14	30	8	9.5
Knox Cube Imitation	550	5	3	6	1.5	6	5	7	1	22.00
Kohs Block Design	551	5	3	7	2	8	6	11	2.5	13.86
Porteus Mazes	558	7.7	7	8.5	.74	8	7.3	8.9	82	34.6

The per cent of overlapping is equal to the number of scores of individuals of 6 years no months to 6 years 11 months mental age beyond the median score of the 7 years no months to 7 years 11 months individuals divided by the total number of scores of the younger group.

The best combination of tests appeared to include the Army Beta, Pintner, Pressey, and Thorndike Non-Verbal. A correlation of the criterion and the average of the sum of the scores weighted 3, 2, 1, and 3 respectively was .7038. When a sampling was taken of the average of the weighted scores of Kohs' Block Design 4, Knox Imitation 6, and Porteus Mazes 10, the correlation was .3541. Therefore, the first combination seemed the better for further experimentation.

As will be seen, the weighting on the basis of the regressions follows closely that assigned. The determinates of the regression equation are 1.0000 for the Army Beta, 1.5931 for the Pintner Combined Score, 2.0957 for the Pressey, and .9967 for the Thorndike Non-Verbal. The solution is presented below. A few composites were worked out on the basis of weights exactly determined, and were ranked. A comparison of samplings of composite scores, weighted by chance and by calculation, showed a difference of not more than 2 between the ranks of any individual, and the signs practically balanced.

$$\begin{aligned}
\overline{X_1} &= \left(\frac{1.000}{= m_1} \frac{61}{61} \right) X^1 + \left(\frac{\beta\mu}{= m_2} \frac{61}{62} \right) X^2 + \left(\frac{\beta\mu'}{= m_3} \frac{\sigma I}{\sigma 3} \right) X^3 + \\
&\quad \left(\frac{\beta\mu''}{= m_4} \frac{61}{64} \right) X^4 \\
&= \left(\left[\frac{1.000 \times 5.84}{11.50} \right] .3850 \right) + \left(\left[\frac{1.5937 \times 5.84}{2.28} \right] .50 \right) + \\
&\quad \left(\left[\frac{2.0957 \times 5.84}{20.808} \right] .575 \right) + \left(\left[\frac{.9967 \times 5.84}{8.19} \right] .469 \right) \\
&= m_1x_1 + m_2x_2 + m_3x_3 + m_4x_4 \\
&= .51x_1 + 4.079x_2 + .586x_3 + .707x_4 \\
\overline{X_1} &= (\overline{X_1} - M_1); x_1 = (X_1 - M_1); x_2 = (X_2 - M_2); x_3 = (X_3 - M_3); \\
&= (\overline{X_1} - 81.12); (X_1 - 11.50); (X_2 - 2.28); (X_3 - 20.808); \\
&\quad x_4 = (X_4 - M_4) \\
&\quad (X_4 - 8.19) \\
&= M_1 + m_1 (X_1 - M_1) + m_2 (X_2 - M_2) + m_3 (X_3 - M_3) + \\
&\quad (X_1 - 11.50) \quad (X_2 - 2.28) \quad (X_3 - 20.808) \\
&\quad m_4 \frac{(X_4 - M_4)}{(X_4 - 8.19)} \\
&= (M_1 - m_1 M_1 - m_2 M_2 - m_3 M_3 - m_4 M_4) + m_1x_1 + m_2x_2 + \\
&\quad \dots \dots \dots \\
&= \left\{ \begin{array}{l} 81.12 \text{ mos.} \\ 10.12 \end{array} \right\} - (.51 \times 11.59) - (4.079 \times 2.28) - (.586 \times \\
&\quad 20.808) - (.707 \times 8.19) + m_1x_1 + m_2x_2 + m_3x_3 + m_4x_4 \\
\overline{X_1} &= (10.12 - 5.8650 - 9.3001 - 12.1934 - 5.7903) + m_1x_1 + \\
&\quad m_2x_2 + m_3x_3 + m_4x_4 \\
&= K + m_1x_1 + m_2x_2 + m_3x_3 + m_4x_4 \\
&= -23.15 + m_1x_1 + m_2x_2 + \dots \dots \dots
\end{aligned}$$

$$X_1 = K (-23.15) =$$

Mos.	Score	m_1x_1	m_2x_2	m_3x_3	m_4x_4
		Army Beta Score	Pintner Comb. Score	Pressey Score	Thorndike N. V. Score
	0				
72	1	$m_1 \times$	$m_2 \times$	$m_3 \times$	$m_4 \times$
73	2	$2m_1 \times$	$2m_2 \times$	$2m_3 \times$	$2m_4 \times$
74	3	$3m_1 \times$	$3m_2 \times$	$3m_3 \times$	$3m_4 \times$
75	4	$4m_1 \times$	$4m_2 \times$	$4m_3 \times$	$4m_4 \times$
76	5	$5m_1 \times$	$5m_2 \times$	$5m_3 \times$	$5m_4 \times$
77	6	$6m_1 \times$	$6m_2 \times$	$6m_3 \times$	$6m_4 \times$
78	7	$7m_1 \times$	$7m_2 \times$	$7m_3 \times$	$7m_4 \times$

For example, the following individuals made the scores recorded on the four tests mentioned above. Their mental ages based on the criterion are indicated. A mental age of 72 months is given a value of 1, 73 months a value of 2, 74 months a value of 3, etc. The score made in a test is multiplied by the value assigned to the number of months of mental age, and by the weight determined (m_1 , m_2 , m_3 , and m_4). The value of these weights appears above the names of the tests. The sum of these products is added to K , a minus quantity in this case, -23.15 . The average score is obtained by dividing by 4.

Ind.	Mental Age in Months	.51 Army Beta	4.079 Pintner Comb.	.586 Pressey	.707 Thorndike Non-Verbal
6	72	12	2	0	2
13	73	8	7	0	1.6
14	74	2	13	44	1
24	75	37	12	42	3
29	76	4	7	34	4
16	77	7	10	33	1
58	78	5	13	35	5

$$\begin{aligned}
 \text{The score of Individual 6} &= (-23.15) + (1 \times .51 \times 12) + (1 \times 4.079 \times 2) \\
 &\quad + (1 \times .586 \times 0) + (1 \times .707 \times 2) \\
 &= -23.15 + .612 + 8.158 \\
 &\quad + 0 + 1.414 \\
 &= -23.15 + 10.184 \\
 &= -12.966
 \end{aligned}$$

The average score is -3.2415

$$\begin{aligned}
 \text{The score of Individual 13} &= (-23.15) + (2 \times .51 \times 8) + (2 \times 4.079 \times 7) \\
 &\quad + (2 \times 5.86 \times 0) + (2 \times .707 \times 1.6) \\
 &= -23.15 + 8.16 + 57.106 \\
 &\quad + 0 + 22.624 \\
 &= -23.15 + 87.890 \\
 &= 64.74
 \end{aligned}$$

The average score is 16.185

$$\begin{aligned}
 \text{The score of Individual 29} &= (-23.15) + (5 \times .51 \times 4) + (5 \times 4.079 \times 7) \\
 &\quad + (5 \times 5.86 \times 34) + (5 \times .707 \times 4) \\
 &= -23.15 + 10.20 + 142.765 \\
 &\quad + 996.20 + 14.14 \\
 &= -23.15 + 1163.305 \\
 &= 1140.155
 \end{aligned}$$

The average score is 285.03875

Footnote. The writer wishes to express her thanks to Dr. H. L. Toops for assistance in the above determining of weights and score solution.

In arriving at these mental ages there are many sources of error:

1. Practically all of the individuals studied at Letchworth had been in school for a year or more, and had definite ways of responding to a pencil and a sheet of printed material. The children in Public School 43 had been in school a very short time when the tests were given them, and had for the most part poorly established habits in that respect.

2. Many of the directions were not understood and either the individual repeated the preceding operation (what he had carried on in the previous test) or did nothing. The reactions in such cases were examples of Thorndike's statement (*Educational Psychology, Briefer Course*, page 149):

There is no arbitrary "hocus pocus" whereby man's natural acts in an unpredictable spasm when he is confronted with a new situation . . . , nowhere are the bonds acquired with old situations more surely revealed in action than when a new situation appears. The child in the presence of a new object, . . . , in all such cases old acquisitions are, together with original tendencies, the obvious determiners of response . . .

Were the situation so utterly new as to be in no respect like anything responded to before, and also so foreign to man's equipment as neither to arouse an original tendency to response nor to be like anything else that could do so, response by analogy would fail. For all response would fail. Man's nature would be simply forever blind and deaf to the situation in question.

This failure to respond may thus be considered a source of error, or a measure of inability.

3. The lack of proportion in the distribution of the individuals according to chronological age and I.Q. emphasizes many facts that are true for a group of feeble-minded individuals of many years of living, and low I.Q., and are not true for the normal group, probably in some cases because of few years of living.

4. The effect of learning through repetition of tests or types of test may not be equal in the two groups. The Letchworth individuals in a number of cases had had the Stanford Revision two to four times. In comparing the results of these examinations a number of factors were kept in mind: *a*) No individual was given this test twice by the same examiner. Although the evaluating of the separate tests is essentially objective, minor variabilities due to each examiner's manner, and the attending circumstances in each case might help or hinder the child's

efforts to do his best. b) The emotional setting of an examination at a clinic when one "does not know what it is all about" may affect the results. The mental age recorded in the commitment papers was often from four months to a year and a half lower than the examiner's findings from tests given within three weeks after actual establishment at Letchworth. In practically no case, however, were the I.Q.'s from the greater mental ages higher than one would expect among individuals committed to a state school for feeble-minded children. In a few cases the results in the later testing were from four to eight months lower. This in no way casts reflection upon the validity of the mental ages obtained through the usual channels before the individuals became a part of the institution. It seems as though there must have been a certain amount of inhibition through fear or apprehension. Some of the children remarked that they had had "those things" before, and liked them better this time because they had been "nervous." However, it is possible that one's responses to certain tests do profit by repetition. Quoting from Thorndike (*Journal of Applied Psychology*, March, 1919):

Improvement is made in score quite innocently in a second trial though the individual has never thought of the test in the meantime by reason of the general familiarity with the tasks, adaptation to them, and whatever other special advantages a preliminary trial gives. In the Binet this averages about 3 mo. of mental age . . .

It has even been found that it averages 5 months for second grade children in ordinary public schools. No individuals in the Public School 43 group were given the Stanford test twice. In the case of repetition of types of test both groups were equally exposed. The amount which "took" certainly would depend in a measure upon the reasons stated in the quotation.

5. Still another error might come from a general assumption on the part of the examiner that the feeble-minded group increased in most cases a negligible amount in mental age within the period of study. The mental ages on file for these individuals gave evidence in general that they increased relatively on the basis of the I.Q. With the older individuals the increase was on a much smaller basis. Moreover, Dr. Kuhlman found in a study of "The Results of Repeated Mental Re-exam-

ination of 639 Feeble-Minded over a Period of 10 Years'' (*Journal of Applied Psychology*, Vol. V, No. 3, page 222, Sept. 1921):

On the whole the mental age ceases to increase between the ages of 15 and 18, the idiot grade ceasing development about three years earlier than the border-line group.

However, an effort was made to eliminate the possibilities of error, in the choice of the material to be tried out with the children, and in the determination of the method of procedure.

GROUPING OF INDIVIDUALS

The reason for selecting 6 years mental age has been stated: To find out what children know upon entering school. Because the average age of school entrance is around 7 years, individuals of a trifle lower mental age were selected on the basis of the Stanford findings. Random samplings of Stanford booklets of 6-year-olds (mentally) show great irregularity in their abilities. Few cases test just VI, that is, pass tests in the VI-year-group only. The total of 72 months in most cases results from a spread of success through two or more year groups. The general tendency is for the V-year-group to be passed, making 60 months, and the remaining 12 months' credit comes from a few of tests in VI, one or two in VII, and so on. It appears that 6 years mental age for individuals of more than 6 years chronological age means somewhere between 6 and 7, and generally nearer 7. With individuals from 16 years through 20 one may feel inclined to believe that 6 years mental age is a very vague affair. Mental ages of the range stated ought to cover the birthday limits.

The chronological age grouping does not coincide exactly with ages or stages of childhood and youth. It is considered that adolescence begins at 13 years, although some authors give 15. However, in a rough way it probably represents the following:

Less than 6 years	.....	early childhood
6—10	.....	late childhood
11—15	.....	pre-adolescence
16—20	.....	adolescence

Other groupings and other titles might well be used.

Grouping on the basis of intelligence quotients follows that in current use. The number of cases has been stated.

As one might suppose, there is a wide range in respect to social status among the individuals studied. Those at Letchworth may be called children of "the diggers and delvers who have nothing to offer but their bodily strength,"—the unskilled laborers. The children of Public School 43 Manhattan come from families where the usual lines of occupation include shoemakers, bus drivers, street car conductors, janitors, oilers, truck drivers, blacksmiths, barbers, policemen, longshoremen, icemen, captains of boats, writers, proofreaders, actors and clerks in small stores. Following Taussig's classification in his *Principles of Economics* (Vol. II, page 134), many of these occupations fit in with his second and third group, although some are included in the group indicated above.

(2) In the next group belong those who, while not needing specialized skill, yet bear some responsibility and must have alertness of mind

(3) In the third group belong the aristocracy of the manual laboring class, the skilled workman. Such are carpenters, bricklayers, plumbers, machinists; the whole range of occupations where there is need for "sure eye, familiarity with tools, a deft and trained hand."

The children of the Horace Mann Kindergarten who formed the third part of the study are chiefly from families of professional pursuits or training,—teachers, doctors, lawyers, merchants, and business men. Although the extremes of the normal curve of distribution in respect to intelligence did not happen to be represented, the extremes of the 525 cases in this study are marked in many respects. In the case of social status it appears that practically all groupings or classifications of occupations are represented, from unskilled day laborers through semi-skilled workers, skilled workmen, clerical workers, professional workers, and salaried business managers. The difference between the extremes in this respect is striking and suggestive.

CONSIDERATION OF THE HISTORY OF THE INDIVIDUALS STUDIED

To appreciate the individuals as such one needs to know more intimately some of their history.

The children at Letchworth were native born. Their parents were chiefly Americans, Germans, Irish Americans, Italians,

Jews and Poles. It is not known whether the parents in every case were also native born. The commitments were made by (1) the court, (2) superintendents of the poor, or by way of (3) transfer from other institutions, in relatively descending order of numbers. The reasons for commitment were (1) "feeble-minded," cannot make the proper adjustments in the community, (2) unable to do school work, (3) insufficient supervision at home, and (4) immorality. In the case of the second agent of commitment, the superintendents of the poor, usually the family had been broken up as a result of incapacitation of the wage earner, or inability to maintain the home, or in cases of some other social emergency. Ten children had been committed or transferred because of lack of accommodations from homes of detention of one kind or other, poor farms, or orphanages, to which they had been sent as small children. None of these had I'Q.'s over .75. The statements in the individuals' records indicate forcibly that the children did not succeed in fitting in with the activities of the community, the work of the school, or with the family life. There is ample evidence of low standards of living on the part of the family. Though it would be unwise to conclude that the parents were feeble-minded, their social adaptations in general give evidences of only fair amounts of intelligence.

Some children were from country districts and some were from the city. In any case it seems fair to state that all of them came from inferior environments.

The Letchworth environment is in marked contrast to what might be termed the children's early environment. The children live in cottages among groups of 70 or so, the basis being sex, chronological age, and mental age. They are well housed, well fed, and well clothed. From the point of view of institution life approaching normal life in the community, this institution is far along the ideal road.

The children certainly were not deprived of social contacts. There were enough in the dormitory groups to satisfy the most gregarious or social beings. All who were able to walk or could be carried easily ate in a common dining room. A large percentage came in contact with the school weekly, bi-weekly, or daily. There were opportunities of seeing their playmates or

chums in their work in the kitchens, sewing rooms, laundry, garden, the barn, about the farm, in the work shops, and in the bakery. There were dances every week, movies on certain evenings, church on Sunday, birthday parties, and holiday celebrations. Visitors were welcome every day. The grounds are so extensive that no one need feel shut in. There are no fences even though a state road passes the grounds. There were no stores on the grounds, but a traveling peddler in a red boxed-in wagon frequently drove through the grounds and the children bought candy, peanuts, and gum of him. Although they did not go to the stores in the nearby town, they saved their pennies, and the attendants bought the candy or jackknife or whatever else they had money for.

One thus can hardly consider that they were impoverished in respect to social contacts. The life situations were similar to those outside,—having to get up and be ready for breakfast, to be ready for school, to wait for a button to be sewed on with the chance of being late in line or late to school, having to change to play clothes after school, and clean up before supper, and going to bed before one wished to, putting on one's best clothes for church, dressing up for visitors, being taken to the hospital when ill, putting away one's toys and filling the pockets with varied acquisitions of "treasures." Automobiles drive through the grounds, and the many curves in the roads and the position of the buildings offered situations for looking to the right and left as in a city. Mail was collected and delivered at the buildings by a boy, so there could be the thrill of receiving and opening a letter. Altogether the village of Letchworth presented an environment offering innumerable everyday life situations.

No intensive study was made of the economic status of the parents or guardians. Although income may be indicative of ability in some cases, it is not a real measure of earning capacity. The wages of a working man for one year may stand for ten times the ability or be the results of ten times the earning power of the imbecile son of wealth with a yearly income one hundred times greater.

Race differences were not considered. The results from what

was done by six colored children were massed with the body of findings.

The children of Public School 43 are probably representative of many New York City schools. They and their parents are in general native born; and no one national group seems to predominate in ancestry. Many of the children were born in or about the city, or moved and have lived here at least six months. The school district covers business and residential sections and is similar to many others. The children come from varying grades of homes,—from those in which the mother goes out to wash and the father to clean,—to the home of the saloon-keeper, owner of a delicatessen store, actor, proofreader, carpenter, and writer.

These children are accustomed to running errands and buying goodies from the grocery, candy, and novelty stores in the neighborhood. There are at least two moving picture houses within five blocks of the school. They are not far from the Hudson River, and the ferry building can be seen from the school steps. Social contacts would be difficult to avoid. The incomes in most of the families are small. Yet the ability to keep a job, support a family, and send children to school clean and at least fairly well-clothed—whether paid in full or not—indicates certain abilities, standards, and ambitions. The poorest of these families may be thought of as similar to about the upper 25 per cent of the parents of children at Letchworth. No special attention was paid to the findings obtained in the case of three colored children attending Grade I.

The part of the study carried on with the children in the Horace Mann Kindergarten is too incomplete for a detailed consideration of the history of the individuals. It is well known that the children constitute a very highly selected group. They come from what would be termed superior homes, where for the most part intelligence and income can make childhood a joy.

On the whole, the individuals studied are the products of varied environments, ranging from those in which living is difficult to those in which it is comfortable and desirable.

THING NOT KNOWN BY INDIVIDUALS OF 6 AND 7 YEARS
MENTAL AGE

As was suggested in the opening paragraph of this study one way of finding out what one has, or another has, or possesses, is to look about and make a list of what is recognized as belongings. Another method suggested was to list supposed possessions and check each item upon discovery, or identification. It would seem in either case that one would be more interested in the lack, absence, or deficiency of a thing rather than in an array of large numbers that necessitated more careful comparison with the total numbers. The answer to how much and how many of each thing an individual has, means relatively nothing unless it is compared with a standard. Averages or medians for groups are presented later on. Data showing how each individual compares with all others or any other in the group are not included.

Like the things which are forbidden and which one tends to remember or to know a great deal about, the things not known by individuals of 6 and 7 years mental age may be more impressive.

An analysis of the inventory given these children has been presented. Pages 47 to 62 list various parts, questions, and requests put to the children, followed by tables indicating the number of individuals who failed to respond satisfactorily to the various situations presented. The bold face numerals indicate the percentage of individuals who failed.

Table IX summarizes the results of the inventory given to 312 individuals at Letchworth, which are classed as the feeble-minded group, and to 200 individuals at Public School 43, Manhattan, called the normal group. The total is 512. The figures on pages 64, 68, 72, etc., represent failures of individuals, grouped according to chronological age, to make adequate or creditable responses to the separate items. Those on pages 65, 69, 73, etc., are on the basis of I.Q. Two rows of figures are presented for each item, the reading matter for which appears on the previous page, under the item number. The upper row refers in every case to the feeble-minded, and the lower one to the normal. The same relation is maintained in the separate totals, T (L) indicating the total number of feeble-

mind ed individuals (at Letchworth) who were unable to respond adequately to each item, T (43) the same fact for the normal children (the P. S. 43 group), and Total including the two separate totals. The numerals in bold face type indicate the percentage in each group and in the two groups together. The table is to be read across the page. For example,—to item 1 of the inventory, “How old are you?” of the Letchworth individuals 20 of 6-10 (inclusive) years chronological age, 33 of 11-15, 5 of 16-20 failed to give creditable responses. The total, T (L), is 58, which is equal to 19 per cent of the Letchworth individuals, and equal to 11 per cent of the 512 individuals given the inventory. None of the children of Public School 43 failed. Continuing across the page,—Of the Letchworth individuals 15 with I.Q. less than .50, 35 with I.Q. between .51 and .70, 5 with I.Q. between .71 and .80, and 3 between .81 and .90 failed. These are the same individuals as those just indicated numerically, but they are treated on the basis of intelligence quotient rather than of chronological age. The total number of failures is 58, and the total per cent is 11.

THE INVENTORY

ITEMS 1-14. SEE PAGES 64-65 IN TABLE IX.

PERSONAL INFORMATION

1. How old are you?
2. When were you born?
3. When is your birthday?
4. What does your father do? What is his work?
5. Tell me one thing that makes you mad, makes you angry, or makes you cross. Another. Another.
6. Tell me one thing that you are afraid of? Another. Another.
7. What do you get jealous of? What does it mean?

GENERAL INFORMATION

8. Where does the president live?
9. Who is the president?
10. Who was the president before him?
11. Who was the first president?
12. Who was Abraham Lincoln?
13. Tell me one thing your heart does for your body. Another. Another.
14. Tell me why your heart beats.

ITEMS 15-28. SEE PAGES 66-67 IN TABLE IX.

15. How many minutes would you boil an egg?
16. How many minutes would you bake a potato?
17. Tell me the names of some trees. Another. Another.
18. " " " " " animals. Another. Another.
19. " " " " " flowers. Another. Another.
20. " " " " " fruit. Another. Another.
21. " " " " " vegetables. Another. Another.
22. " " " " " meat. Another. Another.
23. " " " " " work. Another. Another.
24. " " " " " religion or church. Another. Another.
25. " " " " " trades. Another. Another.
26. " " " " " cloth. Another. Another.
27. What is the United States?
28. Tell me the name of the month when Christmas comes.

ITEMS 29-42. SEE PAGES 68-69 IN TABLE IX.

29. Tell me the name of the month when 4th of July comes.

30. " " " " " " " " Thanksgiving comes.

31. " " " " " " " " Washington's Birthday comes.

32. " " " " " " " " April Fool's Day comes.

33. " " " " " " " " Memorial Day (or Decoration Day) comes.

34. " " " " " " " " Columbus Day comes.

35. " " " " " " " " New Year's Day comes.

36. " " " " " " " " Hallowe'en comes.

37. " " " " " " " " Valentine's Day comes.

38. Tell me the names of the months when we have flowers.

39. " " " " " " " " it snows.

40. " " " " " " " " we find nuts.

41. " " " " " " " " it is hot.

42. What is a citizen?

ITEMS 43-56. SEE PAGES 70-71 IN TABLE IX.

43. What do you put on a letter to mail it? (If answer contains "stamp" what kind of a stamp?)
44. Tell me something the birds build their nests with. Another. Another.
45. Tell me some furniture that goes in the kitchen.
46. " " " " " " " " dining room.
47. " " " " " " " " bedroom.
48. " " " " " " " " bathroom.
49. " " " " " " " " barn.
50. " " " " " " " " library.
52. " " " " " " " " cellar.
53. " " " " " " " " stable.
54. " " " " " " " " garage.
55. Individual is to say "Yes" or "No" to a list of furnishings, read by examiner, to go in the bedroom.
56. Individual is to say "Yes" or "No" to a list of furnishings, read by examiner, to go in the kitchen.

ITEMS 57-70. SEE PAGES 72-73 IN TABLE IX.

57. Individual is to say "Yes" or "No" to a list of furnishings, read by examiner, to go in the parlor or living room.
58. Individual is to say "Yes" or "No" to a list of furnishings, read by examiner, to go in the barn.
60. Individual is to say "Yes" or "No" to a list of furnishings, read by examiner, to go in the bathroom.
61. Individual is to say "Yes" or "No" to a list of furnishings, read by examiner, to go in the garage.
62. Where do the birds go in winter?
63. Tell me one thing that makes the street cars go. Another. Another.
64. " " " " " " it hot in summer.
65. What makes night?
66. Is March colder, warmer, or just the same as June? Which?
67. Tell me the names of the cold months.
68. " " " " " " hot "

KNOWLEDGE OF PARTS

69. Tell me the names of some parts of your body.
70. " " " " " " " " " face.

ITEMS 71-84. SEE PAGES 74-75 IN TABLE IX.

71. Tell me the names of some parts of a tree.
72. " " " " " " " " " house.
73. " " " " " " " " " cart (wagon).
74. " " " " " " " " " an automobile.
75. " " " " " " " " " a stove.
76. " " " " " " " " " bed.
77. " " " " " " " " " chair.
78. " " " " " " " " " book.

LIFE SITUATIONS

79. Suppose you want to buy milk. Tell me the kind of a place, kind of a shop, kind of a store, you go to.
80. Suppose you want to buy meat. Tell me the kind of a place, kind of a shop, kind of a store you go to.
81. Suppose you want to buy bread. Tell me the kind of a place, kind of a shop, kind of a store you go to.
82. Suppose you want to buy fruit. Tell me the kind of a place, kind of a shop, kind of a store you go to.
83. Suppose you want to buy vegetables. Tell me the kind of a place, kind of a shop, kind of a store you go to.
84. Suppose you want to buy beer. Tell me the kind of a place, kind of a shop, kind of a store you go to.

ITEMS 85-98. SEE PAGES 76-77 IN TABLE IX.

85. Suppose you want to buy shoes. Tell me the kind of a place, kind of a shop, kind of a store you go to.
86. Suppose you want to buy a hat. Tell me the kind of a place, kind of a shop, kind of a store you go to.
87. Suppose you want to buy a suit. Tell me the kind of a place, kind of a shop, kind of a store you go to.
88. Suppose you want to buy an overcoat. Tell me the kind of a place, kind of a shop, kind of a store you go to.
89. Tell me the kind of a shop where you buy medicine.
90. " " " " " " " " " " newspapers.
91. " " " " " " " " " " postage stamps.
92. " " " " " " " " " " coal.
93. " " " " " " " " " " writing paper.
94. " " " " " " " " " " ice cream.
95. " " " " " " " " " " train tickets.
96. " " " " " " " " " " candy.
97. " " " " " " " " " " wood.
98. " " " " " " " " " " ice.

ITEMS 99-112. SEE PAGES 78-79 IN TABLE IX.

99. Suppose you want a hair cut. Tell me the kind of a shop you go to.
100. What is the person you send for when you are sick?
101. You like to ride, don't you? Tell me something we can ride on. Tell me all the things we can ride on.
102. Well I am going to say a lot of things and you tell me what we can ride on.
103. Now tell me a lot of things we can wear.
104. Can we wear (Examinee to say, "Yes," if we can wear it, "No," if we cannot.)
105. Now tell me all things we can eat.
106. Can we eat ("Yes," if we can eat them, "No," if we cannot.)
107. Tell me all the things we can drink.
108. Can we drink (as above)
109. Tell me some way the policeman helps us. Another. Another.
110. Why do you go to school?
111. Suppose your dog were hurt. Tell me one place you would go for help.
112. Suppose you wanted to build a house for your dog. Tell me one thing you would use. Another.

ITEMS 113-125. SEE PAGES 80-81 IN TABLE IX.

113. What is the weather to-day?

114. Is it raining, sunshiny, snowing, cloudy, very dark, sleeting, drizzly, showery, windy, no wind.

115. Here is an apple pie. (Cut apple pie for four people.)

116. Identification of the concrete and abstract in picture post cards.

117. Free association of words.

VOCABULARY

MEMORY - AUDITORY

118. Related words.

119. Unrelated words.

120. Nonsense syllables.

121. Digits.

122. Rhythm.

MEMORY - VISUAL

123. Objects.

COLOR

124. Color preference.

124a. Consistency in preference for colors.

FORM

125. Ability to draw a square.

ITEMS 126-139. SEE PAGES 82-83 IN TABLE IX.

126. Ability to draw a circle.

127. " " " " box.

128. " " " " diamond.

129. " " " " triangle.

130. Ability to recognize a circle.

131. " " " " square.

132. " " " " diamond.

133. " " " " triangle.

134. " " " " cross.

135. " " " " sphere.

136. " " " " cube.

137. Ability to identify a star in color (6 stars).

138. " " " " circle in color (6 circles).

139. " " " " square in color (5 squares).

ITEMS 140-153. SEE PAGES 84-85 IN TABLE IX.

140. Ability to identify a cross in color (6 crosses).
141. " " " " triangle in color (7 triangles).
142. " " " " green square (colored form) (2 green squares).
143. " " " " blue circle (colored form) (2 blue circles).
144. " " " " red triangle (colored form) (0 red triangles).
145. " " " an orange cross (colored form) (1 orange cross).

DRAWING

146. Boy, girl, dog.
147. Man, horse, wagon, barn.
148. Story telling.
149. Arrangement of pictures to represent a story.

RHYTHMS

150. Auditory.
151. Visual - kinaesthetic.

ORIGINS

152. Where were you before you were born?
153. Who made you?

ITEMS 154-167. SEE PAGES 86-87 IN TABLE IX.

154. Where do babies come from?
155. Where do they get the babies?
156. Where does butter come from? What is it made of?
157. " " beer come from? What is it made of?
158. " " milk come from?
159. " " potatoes come from?
160. " " coal come from?
161. " do eggs come from?
162. " does paper come from? What is it made of?
163. " " cotton come from?
164. " " leather come from?
165. " " wool come from?

COMPREHENSION OF SOCIAL OR MORAL SITUATIONS

166. Tell me one thing that is wrong to do.
167. Tell me one thing that is right to do.

ITEMS 168-181. SEE PAGES 88-89 IN TABLE IX.

168. Now I am going to say a lot of things and you tell me what is right to do.
169. Suppose you were lost. Tell me one place you would go.
170. Suppose a boy ran away with your hat. Tell me one thing you would do.
171. Suppose the grocer boy dropped a nice red apple out of the bag. Tell me what you would do.
172. Suppose he were taking the apples to the minister's, priest's, rabbi's house. What would you do?
173. Suppose a big boy said, "Come along, . . . , and we will steal some apples." What would you say?
174. Suppose some one left a nice big dish of candy on the table and you promised not to touch it. Then everybody went away but you. Tell me one thing you would do.
175. Suppose . . . stole a pocketbook and you saw him. Then a man came along and asked you if you stole it. Tell me what you would say.

NUMBER RELATIONS

176. Count up to 20.
177. " " " 50.
178. " " " 100.
179. Count backward from 10-1.
180. " " " 20-1.
181. " " " 40-1.

ITEMS 182-195. SEE PAGES 90-91 IN TABLE IX.

182. Count backward from 100-1.

BUY STAMPS AND MAKING CHANGE

183. How many 2-cent stamps can you buy for 10 cents?

184. Here are 5 cents and you want one 2-cent stamp. Pay me. How many cents are left?

185. Here are 10 cents and you want three 2-cent stamps. Pay me. How many cents are left?

186. Here are 5 cents and you want three 1-cent stamps. Pay me. How many cents are left?

187. Here are 10 cents and you want three 2-cent and two 1-cent stamps. Pay me. How many cents are left?

188. Give me half the paper, half the string, half the blocks.

189. Nine pennies and three boxes. How many shall I put in each box so they will have the same number?

190. Six boxes and I put 2 blocks in each box. How many blocks in all? 2 and 2 and 2 and 2 and 2 and 2. 6 2's are how many?

191. Here are 9 blocks. Give me 5. How many have you? 5 and how many are 9?

192. John gives me 4 cents, Harry 4 cents and Bill 2 cents. How many cents have I?

193. There are 8 crayons in this box and 6 crayons in this cover. How many crayons? 8 and 6 are how many?

TIME

194. What time is it?

195. How many hours from breakfast to dinner?

ITEMS 196-209. SEE PAGES 92-93 IN TABLE IX.

196. How many hours from dinner to supper?

197. “ “ “ “ supper to dark?

198. Is it morning, afternoon, or evening? Which?

199. Which is it when you get up?

200. What time is it now?

ORIENTATION

201. When did you come here?

See also 194, 198.

202. Where do you live?

203. Where did you live before you came here?

204. What is the name of this town (or city) we are in?

205. What is the name of this building (place) we are in?

206. Stand in front of your chair.

207. “ back of your chair.

208. “ at the side of your chair.

209. Put your chair opposite that chair.

ITEMS 210-230. SEE PAGES 94-95 IN TABLE IX.

210. Put your hand on the box.
211. " " " in the box.
212. Take your hand out of the box.
213. Put your hand in front of the box.
214. " " " back of the box.
215. " " " on the inside of the box.
216. " " " on the outside of the box.
217. " " " above the box.
218. " " " below the box.
219. Where is North? . . . There is North. Where is East? West?
South?
220. There is North. What is opposite South? West? East? North?
222. Stand there. How far is it from you to me?
223. How far is it from your chair to my chair?
224. " " " " " New York to San Francisco.
225. " " " " " " " Albany?
226. " " " " " " " Boston?
227. " " " " " San Francisco to New York.
228. " " " " " Boston to New York?
229. " " " " " Albany to New York?
230. Pictures.

TABLE IX

NUMBER OUT OF 512 INDIVIDUALS OF SIX AND SEVEN
YEARS MENTAL AGE UNABLE TO GIVE CREDITABLE
RESPONSES TO ITEMS LISTED ON PAGES 47 TO 63

ITEMS 1 TO 230 AND SUPPLEMENT, PAGES 64 TO 97

TABLE IX

NUMBER OUT OF 512 INDIVIDUALS OF SIX AND SEVEN YEARS MENTAL AGE

Item	Chron. Age				Total Letchworth		Total P. S. 43		Total	
	-6	6-	11-	16-20	No.	%	No.	%	No.	%
1		20	33	5	58	19			58	11
	0	0					0			
2		59	117	22	198	63			356	70
	0	158					158	79		
3		50	112	17	179	57			281	55
	0	102					102	51		
4		7	4	2	13	4			45	9
	0	32					32	16		
5		0	0	0	0				0	
	0	0					0			
6		0	0	0	0				0	
	0	0					0			
7		0	2	0	2	1			172	34
	1	169			170	55				
8		64	140	52	256	82			453	89
	1	196					197	99		
9		34	94	26	154	49			335	65
	0	181					181	91		
10		59	128	41	228	73			428	84
	1	199					200	100		
11		55	132	45	232	74			431	84
	1	198					199	100		
12		54	136	48	228	73			421	82
	1	192					193	97		
13		52	113	33	198	63			381	74
	1	182					183	92		
14		44	96	33	173	56			363	71
	1	189					190	95		

UNABLE TO GIVE CREDITABLE RESPONSES TO ITEMS LISTED

I.Q.							(TL)	T(43)	Total
-50	51-	71-	81-	91-	111-	121-130			
15	35	5 0	3 0	0 0		0	58	0	58
63	111	18 0	6 29	0 108	16	1	198	154	356
65	95	13 0	6 20	0 80	1	1	179	102	281
4	6	1 1	2 4	0 24	3	0	13	32	45
0	0	0 0	0 0	0 0	0	0	0	0	0
0	0	0 0	0 0	0 0	0	0	0	0	0
0	2	0 2	0 27	0 131	9	1	2	170	172
106	126	15 4	8 35	1 140	0 17	1	256	197	453
63	72	19 2	0 26	0 136	17	0	154	181	428
85	114	21 4	8 36	0 141	18	1	228	200	428
94	109	20 4	9 36	141	18	1	232	200	431
104	107	19 4	8 36	0 136	16	1	228	193	421
74	95	19 4	9 33	1 127	18	1	198	183	381
73	75	17 3	8 34	134	19	0	173	190	363

TABLE IX—Continued

Item	Chron. Age				Total Letchworth		Total P. S. 43		Total	
	-6	6-	11-	16-20	No.	%	No.	%	No.	%
15		46	123	34	203	65			390	76
	1	186					187	94		
16		74	148	43	265	85			456	89
	1	190					191	96		
17		5	10	3	18	6			18	4
	0	0					0			
18		6	8	3	16	5			16	3
	0	0					0			
19		4	11	3	18	6			18	4
	0	0					0			
20		5	11	2	18	6			18	4
	0	0					0			
21		10	18	4	32	10			32	6
	0	0					0			
22		11	19	4	34	11			34	6
	0	0					0			
23		17	34	14	65	21			65	13
	0	0					0			
24		27	49	10	86	28			268	52½
	1	181					182	91		
25		70	174	66	310	99			510	99½
	1	199					200	100		
26		21	49	11	81	26			89	17¾
	0	8					8	4		
27		53	139	65	257	82			457	89½
	1	199					200	100		
28		57	119	34	210	67			395	77½
	1	184					185	93½		

I.Q.							T(L)	T(43)	Total
-50	51-	71-	81-	91-	111-	121-130			
78	104	16 2	5 31	0 138	16	0	203	187	390
101	126	19 3	8 29	1 140	18	1	265	191	456
6	9	2 0	0 0	1 0	0	0	18	0	18
6	7	2 0	0 0	1 0	0	0	16	0	16
99	6	2 0	0 0	1 0	0	0	18	0	18
7	8	2 0	0 0	1 0	0	0	18	0	18
9	15	4 0	4 0	0 0	0	0	32	0	32
14	14	5 0	0 0	1 0	0	0	34	0	34
227	33	5 0	0 0	1 0	0	0	665	0	65
24	50	9 4	2 30	1 132	15	1	86	182	216
134	145	22 4	8 36	1 141	18	1	310 81	200	510 89
26	44	9 2	1 6	1 0	0	0	81	8	89
135	105	14 4	3 36	0 141	18	1	257	200	457
135	55	12 4	8 35	0 127	18	1	210	185	395

TABLE IX—Continued

Item	Chron. Age				Total Letchworth		Total P. S. 43		Total	
	-6	6-	11-	16-20	No.	%	No.	%	No.	%
29		62	129	30	221	71			409	79 $\frac{9}{10}$
	1	187					188	94		
30		65	144	51	260	83			460	89 $\frac{9}{10}$
	1	199					200	100		
31		65	146	50	262	84			462	90 $\frac{1}{6}$
	1	199					200	100		
32		65	141	43	249	80			449	87 $\frac{7}{10}$
	1	199					200	100		
33		67	152	55	274	88			474	92 $\frac{3}{6}$
	1	199					200	100		
34		67	151	56	274	88			474	92 $\frac{3}{6}$
	1	199					200	100		
35		67	154	59	280	90			480	93 $\frac{7}{10}$
	1	199					200	100		
36		67	155	58	280	90			480	93 $\frac{7}{10}$
	1	199					200	100		
37		67	156	56	279	89			479	94
	1	199					200	100		
38		62	107	29	198	64			398	78
	1	199					200	100		
39		62	141	48	251	80			451	88
	1	199					200	100		
40		65	152	56	273	88			473	92
	1	199					200	100		
41		65	146	54	265	85			465	91
	1	199					200	100		
42		70	174	67	311	100			502	98
	1	193					194	97		

I.Q.							T(L)	T(43)	Total
-50	51-	71-	81-	91-	111-	121-130			
95	93	23 3	9 35	1 132	17	1	221	188	409
135	106	11 4	8 36	0 141	18	1	260	200	460
108	132	22 4	0 36	0 141	18	1	262	200	462
119	112	10 4	7 36	1 141	18	1	249	200	449
122	133	18 4	1 36	0 141	18	1	274	200	474
121	138	7 4	8 36	0 1141	18	1	274	200	474
120	129	21 4	9 36	1 141	18	1	280	200	480
118	130	21 4	9 36	1 141	18	1	280	200	480
118	130	21 4	9 36	1 141	18	1	279	200	479
79	94	20 4	7 36	1 141	18	1	198	200	398
97	124	20 4	9 36	1 141	18	1	251	200	451
107	134	22 4	9 36	1 141	18	1	273	200	473
114	120	21 4	9 36	1 141	18	1	265	200	465
135	145	22 4	9 34	1 137	18	1	311	194	505

TABLE IX—Continued

Item	Chron. Age				Total Letchworth		Total P. S. 43		Total	
	-6	6-	11-	16-20	No.	%	No.	%	No.	%
43		3	1	0	4	1			21	4
	0	17					17	9		
44		0	0	0	0				0	
	0	0					0			
45		0	0	0	0				0	
	0	0								
46		7	0	0	7	2			7	.1
	0	0					0			
47		0	0	0	0				0	
	0	0					0			
48		0	0	0	0				0	
	0	0					0			
49		0	0	0	0				2	.4
	0	2					2	1		
50		0	0	0	0				3	.6
	0	3					3	2		
51		10	26	12	48	15			51	10
	0	3					3	2		
52		7	11	8	26	8			70	14
	1	43					44	22		
53		2	5	1	8	3			96	19
	1	87					88	44		
54		12	3	0	15	5			31	6
	0	16					16	8		
55		14	34	16	64	21			102	20
	0	38					38	19		
56		3	98	32	133	43			205	40
	0	72					72	36		

I.Q.							T(L)	T(43)	Total
-50	51-	71-	81-	91-	111-	121-130			
0	1	0	2	1			4		21
		0	4	12	1	0		0	
0	0	0	0	0			0		0
		0	0	0	0	0		0	
0	0	0	0	0			0		0
		0	0	0	0	0		0	
0	2	5	0	0			7		7
		0	0	0	0	0		0	
0	0	0	0	0			0		0
		0	0	0	0	0		0	
0	0	0	0	0			0		0
		0	0	0	0	0		0	
0	0	0	0	0			0		2
		0	2	0	0	0		0	
0	0	0	0	0			0		3
		0	3	0	0	0		0	
19	22	6	1	0			48		51
		0	2	1	0	0		3	
10	13	3	0	0			26		70
		3	17	21	2	1		44	
0	4	4	0	0			8		96
		2	28	54	3	1		88	
0	6	9	0	0			15		31
		0	8	8	0	0		16	
29	28	4	2	1			64		102
		0	7	29	2	0		38	
71	56	11	4	1			133		205
		1	13	51	7	0		72	

TABLE IX—Continued

Item	Chron. Age				Total Letchworth		Total P. S. 43		Total	
	-6	6-	11-	16-20	No.	%	No.	%	No.	%
57		30	69	22	121	39			165	32
	0	44					44	22		
58		40	91	41	172	55			213	42
	0	91					91	46		
59		36	81	38	155	50			186	36
	0	31					31	16		
60		41	89	45	175	56			198	39
	0	33					23	12		
61		48	125	48	221	71			254	50
	0	33					33	17		
62		58	145	65	268	86			452	88
	1	183					184	92		
63		67	141	29	237	76			428	84
	1	190					191	96		
64		63	173	0	236	75			427	83
	1	190					191	96		
65		70	170	69	308	99			506	99
	1	197					198	99		
66		69	173	67	309	99			473	92
	1	163					164	82		
67		66	169	64	299	96			499	98
	1	199					200	100		
68		66	169	64	299	96			499	98
	1	199					200	100		
69		2	1	1	4	1			4	8
	0	0					0			
70		1	2	1	4	1			4	8
	0	0					0			

I.Q.							T(L)	T(43)	Total
-50	51-	71-	81-	91-	111-	121- 130			
59	50	9 2	2 5	1 34		3 0	121	444	165
82	77	10 2	2 15	1 66		8 0	172	91	263
79	61	11 1	4 6	0 18		6 0	155	31	186
89	70	13 2	3 4	0 14		3 0	175	23	198
105	99	14 2	3 8	0 20		3 0	221	33	254
128	113	20 3	7 33	0 131		16 1	268	184	452
100	115	12 3	9 35	1 134		18 1	237	191	428
98	106	22 3	9 35	1 135		17 1	236	191	427
134	142	222 4	9 31	1 139		18 1	308	198	506
134	144	21 3	9 31	1 175		14 1	309	164	473
128	142	19 4	9 36	1 141		18 1	299	200	499
128	142	19 4	9 36	1 141		18 1	299	200	499
22	1	1 0	0 0	0 0		0 0	4	0	4
3	0	0 0	0 0	0 0		0 0	4	0	4

TABLE IX—Continued

Item	Chron. Age				Total Letchworth		Total P. S. 43		Total	
	-6	6-	11-	16-20	No.	%	No.	%	No.	%
71		3	5	1	9	3			9	2
	0	0					0			
72		2	4	1	7	2			7	1
	0	0					0			
73		2	3	1	6	2			6	1
	0	0					0			
74		2	5	1	8	3			29	6
	0	21					21	11		
75		3	7	1	11	4			54	11
	0	43					43	22		
76		4	9	2	15	5			89	17
	0	74					74	37		
77		4	7	3	14	5			79	16
	0	65					65	33		
78		6	34	16	56	19			59	12
	0	3					3	2		
79		2	5	2	9	3			12	2
	0	3					3	2		
80		0	9	1	10	3			12	2
	0	2					2	1		
81		0	4	2	6	2			10	2
	0	4					4	2		
82		2	6	1	9	3			17	3
	0	8					8	4		
83		3	4	2	9	3			32	6
	0	23					23	12		
84		1	7	0	8	3			63	12
	0	55					55	28		

I.Q.							T(L)	T(43)	Total
-50	51-	71-	81-	91-	111-	121-130			
5	1	2 0	1 0	0	0	0	9	0	9
4	1	1 0	1 0	0 0	0	0	7	0	7
3	1	1 1	1 3	0 0	0	0	6	4	10
6	1	1 4	0 15	0 2	0	0	8	21	29
8	1	1 0	1 4	0 35	4	0	11	43	54
10	3	1 4	1 20	0 48	2	0	15	74	89
12	0	1 2	1 7	0 56	0	0	14	65	79
29	17	9 0	1 1	0 1	1	0	56	3	59
5	4	0 0	0 0	0 3	0	0	9	3	12
4	6	0 0	0 0	0 2	0	0	10	2	12
4	2	0 0	0 0	0 4	0	0	6	4	10
3	6	0 0	0 0	0 8	0	0	9	8	17
4	4	1 2	0 5	0 16	0	0	9	23	32
3	5	0 0	0 9	0 40	6	0	8	55	63

TABLE IX—Continued

Item	Chron. Age				Total Letchworth		Total P. S. 43		Total	
	-6	6-	11-	16-20	No.	%	No.	%	No.	%
85		2	4	1	7	2			98	19
	0	91					91	46		
86		2	3	1	6	2			82	16
	0	76					76	38		
87		2	5	1	8	3			85	17
	0	77					77	39		
88		2	6	1	9	3			104	20
	0	95					95	48		
89		15	17	4	36	12			37	7
	0	1					1	1		
90		14	16	5	35	12			37	7
	0	2					2	1		
91		16	17	5	38	13			41	8
	0	3					3	2		
92		16	18	5	39	13			40	8
	0	1					1	1		
93		17	19	5	41	17			46	9
	0	5					5	3		
94		19	24	5	48	16			66	13
	0	18					18	9		
95		24	27	5	56	19			99	19
	0	43					43	22		
96		27	42	7	76	25			76	15
	0	0					0			
97		33	44	8	85	27			171	33
	0	86					86	43		
98		33	48	8	89	29			105	21
	0	16					16	8		

I.Q.									
-50	51-	71-	81-	91-	111-	121-130	T(L)	T(43)	Total
3	4	0 1	0 19	0 64	7	0	7	91	98
3	3	0 0	0 11	0 57	8	0	6	76	82
3	5	0 0	0 13	0 57	7	0	8	77	85
3	6	0 0	0 16	0 71	8	0	9	95	104
12	17	4 0	2 0	1 1	0	0	36	1	37
12	17	4 0	1 0	1 2	0	0	35	2	37
13	18	4 0	2 1	1 2	0	0	38	3	41
13	19	4 0	2 0	1 1	0	0	39	0	40
13	20	5 0	2 0	1 5	0	0	41	5	46
15	23	7 0	2 2	1 16	0	0	48	18	66
19	26	8 2	2 5	1 34	2	0	56	43	99
21	41	9 0	4 0	1 0	0	0	76	0	76
28	45	8 2	3 13	1 61	0	0	85	86	171
29	48	9 1	3 14	0 1	0	0	89	16	105

TABLE IX—Continued

Item	Chron. Age				Total Letchworth		Total P. S. 43		Total	
	-6	6-	11-	16-20	No.	%	No.	%	No.	%
99		2	2	0	4	1			4	.8
	0	0					0			
100		1	2	0	3	1			20	4
	0	17					17	9		
101		0	0	0	0				0	
	0	0					0			
102		8	17	6	31	10			43	8
	0	12					12	6		
103		0	0	0	0				0	
	0	0					0			
104		5	13	9	27	9			36	7
	1	8					9	5		
105		0	0	0	0				0	
	0	0					0			
106		0	0	0	0				0	
	0	0					0			
107		0	0	0	0				0	
	0	0					0			
108		0	0	0	0				0	
	0	0					0			
109		2	1	1	4	1			5	1
	0	1					1	1		
110		0	0	0	0				1	.2
	0	1					1	1		
111		6	2	0	8	3			78	15
	1	69					70	35		
112		0	0	0	0				6	1
	0	6					6	3		

I.Q.							T(L)	T(43)	Total
- 50	51-	71-	81-	91-	111-	121-130			
2	0	0 0	1 0	0 0		0	4	0	4
1	1	0 0	1 3	0 13		1	3	17	20
0	0	0 0	0 0	0 0		0	0	0	0
9	16	3 0	3 4	0 8		0	31	12	43
0	0	0 0	0 0	0 0		0	0	0	0
7	18	1 16	1 6	0 2		0	27	9	36
00	0	0 0	0 0	0 0		0	0	0	0
0	0	0 0	0 0	0 0		0	0	0	0
0	0	0 0	0 0	0 0		0	0	0	0
0	0	0 0	0 0	0 0		0	0	0	0
1	2	1 0	0 1	0 0		0	4	0	5
0	0	0 0	0 1	0 0		0	0	1	1
3	5	0 0	0 10	0 55		5	8	70	78
0	0	0 1	0 4	0 1		0	0	6	6

TABLE IX—Continued

Item	Chron. Age				Total Letchworth		Total P. S. 43		Total	
	-6	6-	11-	16-20	No.	%	No.	%	No.	%
113		22	40	10	72	23			109	21
	0	37					37	19		
114		63	166	68	207	66			489	96
	1	191					192	96		
115										
116		0	0	0	0				0	
	0	0					0			
117		0	0	0	0				0	
	0	0					0			
118		0	0	0	0				0	
	0	0					0			
119		0	0	0	0				0	
	0	0								
120		70	172	68	310	100			510	100
	1	199					200	100		
121		70	174	67	311	100			511	100
	1	199					200	100		
122		69	168	63	301	96			492	96
	1	190					191	96		
123		0	0	0	0				0	
	0	0					0			
124		63	159	63	285	91			466	91
	1	180					181	91		
124a	See page 96									
125		5	5	2	12	4			30	6
	0	18					18	9		

I.Q.									
-50	51-	71-	81-	91-	111-	121- 130	T(L)	T(43)	Total
28	38	6 1	0 7	0 25		4 0	72	37	109
134	135	20 3	7 32	1 140		16 1	297	192	489
0	0	0 0	0 0	0 0		0 0	0	0	0
0	0	0 0	0 0	0 0		0 0	0	0	0
0	0	0 0	0 0	0 0		0 0	0	0	0
0	0	0 0	0 0	0 0		0 0	0	0	0
135	143	22 4	9 36	1 141		18 1	310	200	510
135	145	22 4	9 36	1 141		18 1	311	200	511
135	143	20 4	3 35	0 135		16 1	301	191	492
0	0	0 0	0 0	0 0		0 0	0	0	0
125	131	20 4	8 34	1 126		16 1	285	181	461
3	6	3 0	0 6	0 12		0 0	12	18	30

TABLE IX—Continued

Item	Chron. Age				Total Letchworth		Total P. S. 43		Total	
	-6	6-	11-	16-20	No.	%	No.	%	No.	%
126		2	1	2	5	2			19	4
	0	14					14	7		
127		3	2	2	7	2			20	4
	0	13					13	7		
128		68	164	65	297	96			472	92
	1	174					175	88		
129		68	168	64	300	98			480	94
	1	179					180	90		
130		2	4	0	6	2			14	3
	0	8					8	4		
131		3	7	3	13	4			40	8
	0	27					27	14		
132		27	110	40	177	57			347	69
	1	169					170	85		
133		58	138	55	248	80			446	87
	1	197					198	99		
134		7	5	0	12	4	8		15	3
	0	3					3	2		
135		1	2	0	3	1			3	1
	0	0					0			
136		0	0	0	0				0	
	0	0					0			
137		62	160	62	284	91			463	90
	1	178					179	90		
138		63	158	62	283	91			462	90
	1	179					180	90		
139		70	163	68	301	96			478	93
	1	170					179	90		

I.Q.							T(L)	T(43)	Total
-50	51-	71-	81-	91-	111-	121-130			
2	2	1 0	0 3	0 11		0 0	5	14	19
3	2	2 0	0 2	00 11		0 0	7	13	20
127	139	22 3	9 33	0 125		13 1	297	175	472
128	141	22 4	9 34	0 127		14 1	300	180	480
0	6	0 1	0 7	0 0		0 0	6	8	14
5	7	1 4	0 20	0 3		0 0	13	27	40
83	79	13 4	2 27	0 133		6 0	177	170	347
89	130	21 3	7 35	1 141		18 1	248	198	446
6	6	0 0	0 3	0 0		0 0	12	3	15
2	1	0 0	0 0	0 0		0 0	3	0	3
0	0	0 0	0 0	0 0		0 0	0	0	0
125	130	20 4	8 33	1 124		17 1	284	179	463
124	130	20 4	8 33	1 124		17 1	283	179	462
132	137	22 4	9 32	1 134		6 1	301	177	478

TABLE IX—Continued

Item	Chron. Age				Total Letchworth		Total P. S. 43		Total	
	-6	6-	11-	16-20	No.	%	No.	%	No.	%
140		61	148	60	269	86			445	87
	1	175					176	83		
141		50	115	53	218	70			347	68
	1	128					129	65		
142		67	173	68	308	99			504	99
	1	195					196	98		
143		62	149	59	269	86			432	84
	1	162					163	82		
144		64	157	64	285	91			469	92
	1	183					184	92		
145		63	162	67	292	94			480	94
	1	187					188	94		
146	See page 108. No per cents were worked out for these two items of the inventory. Some of the drawings were unscorable.									
147										
148		70	172	68	310	100			510	100
	1	199					200	100		
149		70	174	68	312	100			512	100
	1	199					200	100		
150		70	174	68	312	100			512	100
	1	199					200	100		
151		49	67	20	136	44			300	59
	1	163					164	82		
152		54	153	59	266	85			455	89
	1	188					189	95		
153		54	153	59	266	85			455	89
	1	188					189	95		

I.Q.							T(L)	T(43)	Total
-50	51-	71-	81-	91-	111-	121-130			
125	131	20 4	8 34	1 125			285		465
					16	1		180	
117	122	20 4	9 34	1 121			269		445
					16	1		176	
98	95	16 4	8 26	1 90			218		347
					10	1		129	
133	143	22 1	9 35	1 141			308		504
					18	1		196	
114	129	18 3	8 25	1 120			269		432
					15	0		163	
127	136	19 2	9 27	1 140			292		480
					18	1		188	
133	145	22 4	9 36	1 141			310		510
					18	1		200	
135	145	22 4	9 36	1 141			312		512
					18	1		200	
135	145	22 4	9 36	1 141			312		512
					18	1		200	
31	96	0 4	8 30	1 122			136		300
					7	1		164	
119	125	16 3	5 35	1 133			266		455
					17	1		189	
119	125	16 3	35 35	131 133			266		455
					17	1		189	

TABLE IX—Continued

Item	Chron. Age				Total Letchworth		Total P. S. 43		Total	
	-6	6-	11-	16-20	No.	%	No.	%	No.	%
154		14	34	16	64	21			102	20
	0	38					38	19		
155		63	166	68	297	96			489	96
	1	191					192	96		
156		64	161	52	277	89			454	89
	1	176					177	89		
157		65	168	60	292	94			484	95
	1	191					192	96		
158		11	33	5	49	16			95	19
	0	46					46	23		
159		50	158	59	267	85			389	76
	1	121					122	61		
160		67	161	67	295	95			483	94
	1	187					188	94		
161		14	47	30	91	29			171	55
	0	80					80	40		
162		67	171	68	306	99			490	96
	1	83					84	42		
163		70	174	68	312	100			503	98
	1	190					191	96		
164		70	163	68	301	96			478	93
	1	178					179	90		
165		55	151	25	231	74			378	74
	1	146					147	74		
166		1	0	0	0				1	.2
	0	0					0			
167		0	0	0	0				7	1
	0	7					7	4		

I.Q.							T(L)	T(43)	Total
-50	51-	71-	81-	91-	111-	121-130			
29	28	4 0	2 7	1 29			64		102
					2	0		38	
134	135	20 3	7 32	1 140			297		489
					16	0		192	
116	135	19 4	7 33	0 123			277		454
					16	1		177	
127	129	17 4	8 34	1 137			292		484
					16	1		192	
20	23	4 0	1 2	1 42			49		95
					2	0		46	
124	128	14 1	3 21	0 91			267		389
					8	1		122	
128	135	12 4	29 35	1 130			295		483
					18	1		188	
48	38	4 4	1 20	0 43			91		171
					13	0		80	
133	141	22 4	9 36	1 139			306		490
					4	1		184	
135	145	22 4	9 35	1 141			312		503
					10	1		191	
132	137	22 4	9 32	1 134			301		478
					6	1		177	
89	121	18 3	3 24	0 107			231		378
					12	1		147	
0	1	0 0	0 0	0 0			0		0
					0	0		0	
0	0	0 3	0 2	0 2			0		7
					0	0		7	

TABLE IX—Continued

Item	Chron. Age				Total Letchworth		Total P. S. 43		Total	
	-6	6-	11-	16-20	No.	%	No.	%	No.	%
168		40	93	41	174	56			307	60
	1	132					133	67		
169		43	91	47	171	54			275	54
	1	103					104	52		
170		6	2	0	8	3			70	14
	0	62					62	31		
171		10	3	0	13	4			69	14
	0	56					56	28		
172		0	0	0	0				10	2
	0	10					10	5		
173		3	0	0	3	1			27	5
	0	24					24	12		
174		00	0	0	0				14	3
	0	14					14	7		
175		0	0	0	0				30	6
	0	30					30	15		
176		0	0	0	0				0	
	0	0					0			
177		47	50	0	97	31			297	58
	1	199					200	100		
178		50	69	0	119	38			319	62
	1	199					200	100		
179		69	129	24	222	73			422	83
	1	199					200	100		
180		50	105	0	155	50			355	69
	1	199					200	100		
181		70	145	0	215	71			415	81
	1	199					200	100		

I.Q.									
-50	51-	71-	81-	91-	111-	121-130	T(L)	T(43)	Total
63	99	10 2	2 31	0 94	6	0	174	133	307
67	77	18 2	8 19	1 72	10	1	171	104	275
4	4	0 1	0 19	0 34	8	0	8	62	70
5	8	0 2	0 8	0 40	6	0	13	56	69
0	0	0 0	0 1	0 8	1	0	0	10	10
0	3	0 1	0 5	0 17	1	0	3	24	27
0	0	0 0	0 5	0 9	0	0	0	14	14
0	0	0 0	0 2	0 25	3	0	0	30	30
0	0	0 0	0 0	0 0	0	0	0	0	0
20	50	17 4	9 36	1 141	18	1	97	200	297
60	100	22 4	9 36	1 141	18	1	119	200	319
50	142	20 4	9 36	1 141	18	1	222	200	422
57	78	10 4	9 36	1 141	18	1	155	200	355
60	127	22 4	9 36	1 141	18	1	215	200	415

TABLE IX—Continued

Item	Chron. Age				Total Letchworth		Total P. S. 43		Total	
	-6	6-	11-	16-20	No.	%	No.	%	No.	%
182		70	174	36	280	90			480	94
	1	199					200	100		
183		52	76	41	169	53			347	68
	1	177					178	89		
184		17	47	16	70	22			137	27
	1	66					67	34		
185		36	58	20	114	37			280	55
	1	165					166	83		
186		9	21	2	31	10			48	9
	0	17					17	9		
187		53	78	27	158	51			320	63
	1	161					167	84		
188		7	12	8	27	9			39	8
	0	12					12	6		
189		43	155	65	263	84			458	90
	1	194					195	98		
190		43	155	66	264	85			463	91
	1	198					199	100		
191		44	155	66	265	85			444	87
	1	178					179	90		
192		27	19	4	50	16			237	46
	1	186					187	94		
193		27	36	20	83	27			269	53
	1	185					185	93		
194		67	161	52	280	90			474	93
	1	193					194	97		
195		70	174	68	312	100			512	100
	1	199					200	100		

I.Q.							T(L)	T(43)	Total
-50	51-	71-	81-	91-	111-	121-130			
103	145	22 4	9 36	1 141	18	1	280	200	480
75	81	10 4	3 30	0 135	8	1	169	178	347
29	36	3 4	2 19	0 40	3	1	70	67	137
31	59	19 4	4 31	1 115	16	1	114	166	280
10	15	3 3	0 7	0 5	2	0	31	17	48
54	90	4 4	0 25	0 129	3	1	158	162	320
14	10	3 3	0 7	0 22	0	0	27	12	39
124	114	15 4	9 34	1 139	17	1	263	195	458
125	114	15 4	9 35	1 141	18	1	264	199	463
125	116	15 0	8 22	1 138	18	1	265	179	444
11	31	8 4	0 36	0 130	16	1	50	187	237
33	43	7 4	0 32	0 137	13	1	83	186	269
113	139	18 4	9 34	1 137	18	1	280	194	474
135	145	22 4	9 36	1 141	19	1	312	200	512

TABLE IX—Continued

Item	Chron. Age				Total Letchworth		Total P. S. 43		Total	
	-6	6-	11-	16-20	No.	%	No.	%	No.	%
196		70	174	68	312	100			498	97
	1	185					186	93		
197		70	173	168	311	100			500	98
	1	188					189	95		
198		2	19	0	21	7			30	6
	0	9					9	5		
199		2	19	0	21	7			30	6
	0	9					9	5		
200		70	172	68	310	100			502	98
	0	192					192	96		
201		43	104	16	163	52			163	32
	0	0					0			
202		1	6	1	8	3			8	2
	0	0					0			
203		3	4	0	7	2			7	1
	0	0					0			
204		30	38	12	80	26			83	16
	0	3					3	2		
205		7	25	1	33	11			33	6
	0	0					0			
206		3	1	0	4	1			4	1
	0	0					0			
207		3	1	0	4	1			4	1
	0	0					0			
208		3	1	0	4	1			4	1
	0	0					0			
209		91	153	67	292	94			480	94
	1	187					188	94		

I.Q.							T(L)	T(43)	Total
-50	51-	71-	81-	91-	111-	121-130			
135	145	22 4	9 34	1 133	14	1	312	186	498
135	144	22 4	9 34	1 134	16	1	311	189	500
5	16	0 0	0 4	0 5	0	0	21	9	30
5	16	0 0	0 4	0 5	0	0	21	9	30
134	144	23 4	9 34	1 136	18	0	310	192	502
59	85	13 0	5 0	1 0	0	0	163	0	163
1	6	1 0	0 0	0 0	0	0	8	0	8
1	5	0 0	0 0	1 0	0	0	7	0	7
28	43	7 0	2 1	0 1	1	0	80	3	83
9	22	2 0	0 0	0 0	0	0	33	0	33
2	2	0 0	0 0	0 0	0	0	4	0	4
2	2	0 0	0 0	0 0	0	0	4	0	4
2	2	0 0	0 0	0 0	0	0	4	0	4
128	135	20 2	8 27	1 137	17	0	292	188	480

TABLE IX—Continued

Item	Chron. Age				Total Letchworth		Total P. S. 43		Total	
	-6	6-	11-	16-20	No.	%	No.	%	No.	%
210		3	1	0	4	1			4	1
	0	0					0			
211		2	0	0	2	1			2	.4
	0	0					0			
212		2	0	0	2	1			2	.4
	0	0					0			
213		3	1	0	4	1			4	1
	0	0					0			
214		0	0	0	0				0	
	0	0					0			
215		2	7	0	9	3			9	2
	0	0					0			
216		0	0	0	0				0	
	0	0					0			
217		65	140	44	249	80			440	86
	1	190					191	96		
218		62	160	63	285	91			466	91
	1	180					181	91		
219		70	172	66	308	99			508	99
	1	199					200	100		
220		70	174	68	312	100			512	100
	1	199					200	100		
221-229		70	174	68	312	100			512	100
	1	199					200	100		

I.Q.							T(L)	T(43)	Total
-50	51-	71-	81-	91-	111-	121-130			
2	2	0 0	0 0	0 0			4	0	4
0	2	0 0	0 0	0 0	0	0	2	0	2
0	2	0 0	0 0	0 0	0	0	2	0	2
2	2	0 0	0 0	0 0	0	0	4	0	4
0	0	0 0	0 0	0 0	0	0	0	0	0
3	6	0 0	0 0	0 0	0	0	9	0	9
0	0	0 0	0 0	0 0	0	0	0	0	0
118	113	10 4	7 33	1 134			249		440
					17	1		191	
126	130	20 4	8 34	1 121			285		466
					16	1		181	
133	145	21 4	8 36	1 141			308		508
					18	1		200	
135	145	22 4	9 36	1 141			312		512
					18	1		200	
135	145	22 4	9 36	1 141			312		512
					18	1		200	

SUPPLEMENT TO TABLE IX

Item	Chron. Age				Total Letchworth		Total P. S. 43		Total	
	-6	6-	11-	16-20	No.	%	No.	%	No.	%
132-1		32	108	37	177	57			318	62
	1	140					141	71		
133-a		52	142	58	253	81			373	73
	1	119					120	60		
b		2	2	0	4	1			7	1
b	0	3	2	0			3	2		
c		1	3	0	4	1			12	2
	0	8					8	4		
d		0	0	0	0				23	4
	0	23					23	12		
124-a		66	168	67	301	97			493	96
Con.	1	191					192	96		
b		63	158	62	283	91			441	87
4	1	157					158	79		
c		61	148	60	269	86			448	88
3	1	129					130	65		
145-e		26	69	23	118	38			248	49
	1	129					103	52		
f		21	57	24	102	33			205	40
	0	103					102	51		
g		70	174	68	312	100			512	100
	1	199					200	100		
h		67	160	53	280	90			457	88
	1	176					177	89		
188½		70	174	68	312	100			512	100
	1	196					197	99		
½		70	174	68	312	100			511	100
	1	198					199	100		

(Parts of Items not in Table.)

I.Q.							T(L)	T(43)	Total
-50	51-	71-	81-	91-	111-	121-			
82	82	11 2	2 25	0 101	12	1	177	141	318
116	112	17 4	7 23	1 83	9	1	253	120	373
2	2	0 1	0 2	0 0	0	0	4	3	7
0	4	0 1	0 7	0 0	0	0	4	8	12
0	0	0 2	0 21	0 0	0	0	0	23	23
134	135	22 4	9 35	1 138	17	0	301	192	493
124	130	20 4	8 36	1 100	17	0	283	158	441
115	124	20 4	9 36	1 140	9	0	269	179	448
41	50	19 4	7 30	1 81	14	1	118	130	248
31	49	15 3	6 20	1 73	7	0	102	103	205
135	145	22 4	9 36	1 141	18	1	312	200	512
120	129	21 4	9 25	1 134	13	1	280	177	457
135	145	22 4	9 35	1 180	17	1	312	197	509
135	145	22 3	9 36	1 141	18	1	312	199	511

TABLE X
MEDIAN NUMBER OF CREDITABLE RESPONSES GIVEN TO THE ITEMS
IN THE INVENTORY

Below are shown the median number of creditable responses given by individuals of 6 years no months through 7 years 11 months mental age to items 5, 6, 7 etc. Of the Letchworth Individuals, those of 6-10 years chronological age gave, as a median number, 2 creditable responses to Item 5,—“Tell me one thing that makes you mad, makes you angry, or makes you cross. Another. Another.” Similarly 2 creditable answers were given by those of 11-20 years. Of the children from P. S. 43 those of 6-10 years gave 1 creditable response. Of the Horace Mann Kindergarten children those less than 6 and those 6 years or over gave 1 creditable response.

Items	Letchworth		P. S. 43	H. M. K.	
	6-10	11-20	6-10	-6	6-
5, 6, 7	2	2	1	1	1
17	3	3	2	4	4
18	3	3	4	5	5
19, 20	3	3	3	5	5
21	2	2	3	5	5
22	1	1	2	3	3
23	3	3	2	2	2
24	0	0	0	0	0
25, 26	1	1	0	0	0
44	2	2	1	2	2
45, 46	4	4	3	5	5
47, 48	3	3	5	5	5
49, 50	3	3	3	2	2
51, 52, 53, 54	1	1	1	4	4
69, 70	3	4	2	5	5
71	3	4	3	2	2
72, 73, 74	3	3	3	3	3
75	1	1	1	3	3
76	2	2	1	3	3
77, 78	1	1	1	3	3
101	3	3	3	4	4
103	5	5	4	5	5
105	4	4	4	7	7
107	4	4	2	3	3
116	20	24	20	20	20
117	20	30	20		
118	20	20	20	0	0
119	3	4	3	0	0
120	0	0	0	0	0
121	4	4	4	4	4
123	5	5	4		
150	2	2	2		
151	1	1	0		
166	2	2	2	1	1
167	1	1	1	1	1
176	100	100	20		

THINGS NOT KNOWN BY INDIVIDUALS OF 6 AND 7 YEARS
MENTAL AGE

The items in which only a few succeeded may not always have been worded appropriately for the three groups, in order to elicit the response. On the other hand, failure to understand was surely due in many cases to real inability.

The general topics are treated in the order already presented. Personal Information is given first. The individuals, on the whole, did not respond creditably to "When were you born?" [2]. It evidently conveyed the idea very poorly, for they did not know their birthdays. The sum total in regard to "What do you get jealous of?" [7] is weighted by the large percentage of Public School 43 children who did not know the meaning of the word jealous.

Of the General Information items they did not know where the president lives [8], who is president [9], who was president before him [10], who was the first president [11], and who was Abraham Lincoln [12]. The vague associations in connection with the items is evidenced in such responses as "God" for president, and "head-boss" for Abraham Lincoln. They did not, in general, know one thing the heart does for the body [13] nor why it beats [14]. They suggested that "it eats stuff," and "gives you heart trouble," [13] and "makes you talk good," and "because Jesus makes it beat" [14]. They did not know how many minutes to boil an egg [15] or to bake a potato [16]. They would boil the eggs from one minute to an hour [15] and bake the potato from one minute to three hours [16]. Fifty-five individuals gave plausible answers to "What is the United States?" They did not know the names of religions or churches [24], or trades [25]. They did not know the names of months when Christmas [28], 4th of July [29], Thanksgiving [30], Washington's Birthday [31], April Fool's Day [32], Memorial or Decoration Day [33], Columbus Day [34], New Year's [35] Hallowe'en [36] or Valentine's Day [37] come. They were unable to name the months when we have flowers [38], it snows [39], we find nuts [40], and when it is hot [41]. Only 7 individuals knew what a citizen is [42]. They did not know where the birds go in winter [62].

The majority could not tell one thing that makes the street cars go [63]. Some thought the oil, the crank, or the track did it. Few knew what makes it hot in summer [64] although some ventured with "the heat" or "Our Lord." They did not succeed so well in telling what makes night [65]. Some thought it was the moon, or black clouds. They did not know whether March was colder, warmer, or just the same as June [66]. They did not know the names of the cold or hot months [67, 68].

In Auditory Memory of Nonsense syllables [120] only 2 individuals out of the entire number succeeded in repeating even one. This was "ing," which doubtless had a bit of familiarity in it.

Some reference has been made to color preference. Although they were asked to start with the color they liked best the majority failed to repeat the use of 3, 4, or 5 of the colors, and also showed little consistency in preference for colors. They were unable to draw a diamond [128] or triangle [129]. They also failed to recognize the diamond [132] and the triangle [133] when shown in surface area.

For identification of form in color the Woodworth and Wells test sheet was used. The forms in the fifth, sixth, and seventh rows had been colored so that the stars were brown, the circles blue, the squares green, the crosses orange, and the triangles red. They failed to do this in the opportunities offered, in the case of the star [137], the circle [138], the square [139], the cross [140] and the triangle [141]. The directions were identical with those used in the case of the last three lines of the sheet in which all the forms in the first and sixth rows were colored orange, in the second and seventh green, in the third and eighth red, in the fourth and ninth blue, and in the fifth and tenth brown. Specific directions were given. "Put a black mark like this | through all the green squares." [142]. "Put a black mark like — through all the blue circles" [143]. "Put a black mark like X through all the red triangles" [144]. "Put a black mark like // through all the orange crosses" [145]. Very few succeeded in this test either. A possible reason for failure in both types is the variety in the methods of identifying. Then, too, "through all the green squares" may have been two things to do,— "mark green things and mark squares."

Some success must have been due to chance in responding to "red" in the directions for [144] and consequently in identifying the triangle because it was red. The work of identifying a form of a particular color [142-145] when the form appeared in other colors was still more difficult.

Little was done with story telling [148] as such. The Letchworth individuals were very slow in thinking of stories, and when they did tell them they were usually the type of story told in one's childhood. A set of colored pictures were taken from *First Journeys in Numberland*, by Ada Van Stone Harris and Lillian McLean Wald, a book for primary classes. It represents "Samuel's Busy Day." The pictures had been mounted separately, and were presented to the child after thorough shuffling. The child was to arrange them to represent a story [149]. It was possible to gather the story order from the activities of Samuel, or from the clock faces shown in each picture, or from the legend beneath each one. No individual at Letchworth was able to do this, and the performance was omitted.

The work with the Foxy Grandpa pictures, one of the Army performance series, was also very poor. Only two individuals at Letchworth succeeded.

For Auditory Rhythm [150] the examiner beat out with pencil the following, repeating each series five times. The heavy stroke is typed large, 12, 123, 124, 1234, and 1234. The individuals usually repeated 2 series.

The first test in the Thorndike Non-Verbal Test was regarded as a test of visual-kinaesthetic memory [151]. One row of rhythms was usually done.

In the questions regarding Origin only six really knew where they were before they were born [152]. In the strict sense they did not know who made them [153]. They were ignorant of the origin of butter [156], beer [157], potatoes [159], coal [160], eggs [161], paper [162], cotton [163], leather [164] and wool [165].

Their failure to respond correctly to a list of things right or wrong to do [168] has been mentioned under the consideration of the comprehension of social or moral situations. Failure to tell where they would go if lost [169] might indicate never

meeting such a situation, never thinking about it, or lack of resourcefulness.

The Number Relations have been mentioned. In the counting [176, 7, 8] most of the individuals could count to 20, but only a few to 50 or 100. None of the younger children could count backwards, but a few of the older ones could from 10-1 [179], 20-1 [180], 40-1 [181], 100-1 [182].

In buying stamps and making change they failed to give correctly the number of 2-cent stamps for 10 cents [183], or the number of cents change after buying a 2-cent stamp from 5 cents [184], three 2's from 10 cents [185] and three 2-cent and two 1-cent from 10 cents [187]. They were unable to give a third of a piece of paper, string, or a third of 12, 9, 6 or 3 blocks [188]. They did not know how to distribute 9 pennies in 3 boxes so that there would be an equal number in each [189]. Six 2's were also a stumbling block [190]. Five and how many are 9 [191] produced a majority of failures. Likewise there was poor success with $4 + 4 + 2$ [192], and $8 + 6$ [193].

They did not know the time [194], nor the number of hours from breakfast to dinner [195], dinner to supper [196], or supper to dark [197], nor could they tell time when looking at the clock face [200].

In the Orientations few knew the meaning of opposite [209, 220], above [217] and below [218], the directions North, South, East, and West [e 19, 220], nor distances [221, 2, 3, 4, 5, 6, 7, 8, 9].

THINGS KNOWN BY INDIVIDUALS OF 6 AND 7 YEARS MENTAL AGE

If one assumes that 75 per cent of the responses of individuals studied in a certain respect is representative of the responses of the entire group, he may in this study consider 234, 150, and 384 cases respectively from this point of view for the Letchworth, Public School 43, and for both groups. These or greater numbers in Table IX show that the majority of 6-year-olds were unable to respond creditably, or that they failed to know or understand the situation presented. Seventy-eight, 50 and 128 or smaller numbers respectively indicate 75 per cent or more, of success.

From Table IX one finds that of the entire group of 512

individuals questioned as to certain bits of Personal Information the majority know how old they are [Item 1], the birthday [3] and the father's occupation [4]. In the last item 467 creditable responses were obtained from 512 individuals, while Dr. G. Stanley Hall obtained 8945 out of 1,000, the percentage being a trifle smaller in his findings. They know something that makes them angry [5] such as "when they beat me up," "they laugh at me," "when I spoil my work," and "when the devil comes in my heart." The answers for the most part signify expressions of disapproval by others toward the individual, a thwarting of desires, and a certain amount of sophistication in regard to the causes of the anger. They also know something they are afraid of [6] such as animals, strange people, the dark, the devil, and robbers. Outside of "animals," fox, monkey, the dark, and "when I get tired," none of the sources of fear had been seen in real life. They were known only through the movies. They also know what they are jealous of [109], such as food, presents, and "when a fellow goes home."

Of the General Information Situations they can give the names of at least 2 trees [17]—apple, pear, and cherry were given most frequently—3 names of animals [18] are given, such as bear, dog, lion, and tiger. Among the 3 names of flowers given by each individual [19] daisy and rose are most numerous. The 3 names of fruit [20] vary in preference of apples, oranges, bananas, and pears. The average number of vegetables [21] are 2, and are usually potatoes and cabbage. One kind of meat [22] is the average. They generally say pig's meat, pork, and ham. At least two kinds of work [23] are named, the most frequently given is "make beds." Only one name of cloth [26] is the usual number. A variety of answers include floor-, dust-, wax-, thin, table-, and rags. They know one must put a stamp on a letter to mail it [43] and that it must be red or a two-cent stamp [43]. They know at least one thing the birds build their nests with [44]. Their answers include branches, grass, horse hair, leaves, mud, and straw. They can name at least 3 pieces of furniture for the following rooms, kitchen [45], parlor or livingroom [46], dining room [47], bedroom [48], bathroom [49], and barn [50], and 1 piece for the library [51], cellar [52], stable [53], and garage [54].

When Knowledge of Parts was inquired into they were able to name at least

- 2 parts of the body [69], most frequently belly, stomach, eyes and mouth.
- 2 parts of the face [70], most frequently eyes, nose, mouth.
- 3 parts of a tree [71], most frequently branches, leaves, and limbs.
- 3 parts of a house [72], most frequently doors and windows.
- 3 parts of a cart [wagon] [73], most frequently wheels.
- 3 parts of an automobile [74], most frequently crank and wheels.
- 1 part of a store [75], most frequently candy.
- 1 part of a bed [76], most frequently blankets, legs, and sheets.
- 1 part of a chair [77], most frequently back and legs.
- 1 part of a book [78], most frequently pages and pictures.

Many items listed under Life Situations might belong quite properly under some other heading. They are classified in this manner because of their frequent occurrence in everyday affairs.

These individuals know the kind of place, shop, or store where one may buy milk [79], meat [80], bread [81], fruit [82], vegetables [83], beer [84], shoes [85], a hat [86], a suit [87], an overcoat [88], medicine [89], newspapers [90], postage stamps [91], coal [92], writing paper [93], ice cream [94], train tickets [95], candy [96], wood [97], and ice [98]. The answers were not always indicative of whether the child really knew or not. When he merely said the word store after bread, milk, or vegetables, he might or might not have known. When they said they bought meat at the meat factory, there was no room for doubt.

They know where to get a hair cut [99] and what person to send for when they are sick [100].

When asked to tell things they can ride on [101], to wear [103], to eat [105] and to drink [107] they gave

- 3 things to ride on, among which most frequently are given auto, horse and wagon.
- 4 things to wear " " " " " " skirt, shoes, and stockings.
- 4 things to eat " " " " " " apples, meat, oranges, potatoes.
- 2 things to drink " " " " " " milk and tea.

They also knew when to say "Yes" and when to say "No" to a list of things to ride on [102], to wear [104], to eat [106] and to drink [108].

The usual answer given in regard to some way the policeman helps us [109] is by "killing robbers." Some stated that

the policeman "makes autos go slow," "gives you money to buy candy," "helps you in the wagon," "helps us if we are lost" and "takes you across the street."

The usual reasons for going to school [110] are to learn something, to get smart, and to be good.

If the dog were hurt [111], they would go to the hospital, to the cop, or home, for help. The things that would be used in building a house for the dog [82] were chiefly boards, hammer, and nails. The weather [113] was frequently bad, cold, nice, or warm, but there was no evidence of uncertainty in their responses when they were asked "Is it raining——?" [114].

The cutting of the "apple pie" [115], a four-inch circular piece of manila paper, produced the unexpected. The situation was this: "Here is an apple pie and we are going to have a party. There will be Miss ——, ——, you and I. You cut the pie for us." The suggestion, of course, was that the pie be cut in four pieces. Some of the children cut a large piece for Miss —— "because she's nice," and a small piece of pie for himself "because it makes me sick." Others cut 6 or 8 pieces "so they can have more when they eat it up." It was very evident that the cutting of the pie represented a reality to most of them.

Fifty-four picture post cards were shown in six series of eight, and one of six. They were selected for some one conspicuous element. The purpose was that the individual should identify the concrete and the abstract in them [116]. The experimenter spread out a series of 8 cards, and told the child to find the picture of a mountain, river or bridge, and so on to six cards. The remaining two cards in each series, and the entire seventh set, the child was given an opportunity to "tell about." The elements to be identified were:

I	II	III
a. mountain	a. winter	a. castle
b. snow	b. springtime	b. moonlight
c. vegetables	c. canal	c. street scene or market
d. clouds	d. ocean	d. cascade
e. night	e. battle	e. river
f. autumn	f. parade	f. city gate
g. harbor	g. peasants	g. glacier
h. stable	h. woodland and water	h. spring

IV

- a. statue monument
- b. fisherman
- c. fruit
- d. bridge
- e. wind blowing
- f. harvest
- g. ocean
- h. port

VI

- a. sunrise
- b. fishing
- c. battleship
- d. pond
- e. cathedral
- f. meadow
- g. sailing vessel
- h. flag

V

- a. reapers
- b. patriotism
- c. flock
- d. sunshine
- e. waterfall
- f. desert
- g. Rembrandt-Night Watch
- h. moonlight

VII

- a. wind blowing
- b. winter
- c. cliff dwellings
- d. quiet waters
- e. inland fishing
- f. country life

The average number identified was 18, and the greatest difficulty was in finding autumn, canal, cascade, monument, reapers, patriotism, desert, and cathedral. The accounts given to the remaining two cards in each series and series VII were largely in terms of enumeration. Because description was given to other pictures by a large majority it was felt that from a request to "show me a picture of a castle," etc., the idea was carried over, and separate objects were prepotent. Moreover, few of the pictures represented activity or individuals, but to those few descriptions were given.

In the Free Association of Words [117] an average of 20 words was given in three minutes. By actual count 1,165 different words were given by the 552 individuals. They are simple, largely monosyllabic, and concrete. The majority are nouns, names of things in the immediate environment or the vicinity—animals, wearing apparel, proper nouns, foods, toys, implements, and utensils. The words given most frequently were the stimulus words, clouds, dog, chair, and happy. Few individuals gave words according to classes. Most of them looked about in their search for something to name. Very few unusual words appear, and they can be accounted for through intimate knowledge of the individual.

Though there need not necessarily be a close relation be-

tween the words one gives in free association and the words one is able to define, it seems as though one ability would not be at least the reverse of the other. Comparatively few words were defined by these individuals in the vocabulary test of the Stanford Revision. In fact, some individuals did not reach the vocabulary test in their examination. A study was made of the number of words defined in the first column. The median number defined by Ungraded children is 7. The difference is due largely to the fact that there seems to be a slight increase in the number of words with chronological age. The number in the second list was not studied carefully, but in practically every instance the total number is 2 or 3.

In the tests for Auditory Memory the individuals gave at least four and usually 20 after hearing these related words [118]:

“ The children will go out in the snow,
And have some jolly fun,
They’ll make big balls while the snow falls
Until a snowman is done.”

Of the unrelated words [119] dog, sky, warm, book, fat, jump, clean, body, under, and happy, they gave on an average 3 words. Series of 3, 4, and 5 digits [121] produced an average success in 4. Visual memory [123] from objects was tried out with toys,—a dog, book, soap, canoe, doll, brush, ball, tube of tooth paste, a swan, and a small wrist watch. Five objects were usually recalled, the watch being the most popular.

Three opportunities were given to use the colors preferred. At the child’s left was a box of sixteen crayons, two of each color. A sheet of paper was placed before him upon which to draw with crayon a geometric form. He was told (1) “Take the color you like the very best. Make me a circle” When that performance was completed he was told (2) “Now we will start all over from the beginning. Take the color you like the very best.” He was then given a sheet of the Woodworth and Wells Learning Test with the five numbered forms and only 4 rows of forms visible. “Put a big mark through the square” Then in a little while he was told, (3) “Now we will start all over. What color did you say you liked the very best?” A sheet with 10 geometric forms in outline was

then presented. "Well, put a big line through the circle. Good. Now, what color did you say you liked next best? Well, make a big line through the square . . ."

The colors in descending order of preference [124] were red, blue, yellow, green, orange, purple, brown, and black. Only 46 individuals or 9 per cent used the same 5 colors in the three opportunities to show preference; 19 or 4 per cent used them in the same order, showing consistency of preference [124a].

There were many opportunities to show ability in respect to Form. The individuals were able to draw a square [125], a circle [126] and a box [127]. Because the word box is used so frequently in the kindergarten and Grade I and by psychologists testing children for square, oblong, representation of a box in perspective, and cube, that credit was given for these uses of the word. They recognized the circle [130], the square [131], the cross [134], the sphere "ball" [135], and the cube [136], all in solids. The percentages are relatively larger in the cases of the square, sphere, and cube, than those obtained by Hall. They are 92 per cent [472 cases], 99 per cent [509], and 100 per cent [502] in comparison with 55 per cent [5474], 76 per cent [7623], and 70 per cent [6957] respectively.

The children were asked to draw a boy, girl, and dog. At first these three were in a story, given below, read to the individuals by the examiner. The drawing as a result of the sittings seemed no better than those produced upon "Draw a boy," "Draw a girl," "Draw a house," so reading of the story was abandoned and the above directions were given to groups of individuals whenever possible. The drawings speak for themselves.

Miss Florence Goodenough has made a very careful study of children's drawings of a man. She has worked out a rating for them with mental age equivalents. Her study suggests similar evaluating of the drawings of a girl, a dog, a horse, a wagon, and a barn. The only drawings considered were those of a man, 150 of which Miss Goodenough kindly scored. All but nine individuals made an attempt to draw what was asked, but the products of many were so disorganized as to be unscorable.

The Story Telling [148] consisted of a repetition by the

individual of one read by the examiner. The first story read as follows: "One day/Jack and Mary/were out walking/. They saw/a poor little dog/running along/and they called out/, "Come doggie, doggie/nice little doggie/and he came/right up to them/. Then Jack and Mary/petted him/. After that/the little dog/walked right along/with them."

The second one was,—"One day/Mr. Brown/hitched his brand new horse/, Jerry/to a brand new wagon/and drove to town/. When it was time to come home/Jerry was so hungry/that he ran all the way home/right up to the barn door/. Mr. Brown/could hardly open it/because Jerry/kept putting his head/right in the way/,—he was so anxious/to go in/to his supper."

The number of memories based on the separations indicated by this line / were recorded. All could remember at least one idea, but the reading and recall took so much time that the story telling was omitted entirely in the Public School 43 group.

Though few individuals answered absolutely correctly "Where do they get the babies?" [155] the majority gave creditable answers such as "from the doctor," and "at the hospital."

The Origin of Milk [158] was the only one known out of the following list,—butter [156], beer [157], potatoes [159], coal [160], eggs [161], paper [162], cotton [163], leather [164], and wool [165].

Comprehension of Social or Moral Situations was evidenced by a large majority of creditable responses. The things that are wrong to do [166] are substantially those of the Ten Commandments. A list of things including many wrongs was read to the examinee. Few responded correctly, probably because many of the words were unknown. Chance helped somewhat, but when an individual said, "Yes" to everything, or "No," the entire response was discredited. The things that are right to do [167] are usually the negative to the answers given in regard to things wrong to do. The individuals knew what to do if a boy ran away with their hat [170]:—they would "go after it." Likewise when a boy was asked what he could do if a girl ran away with it, he would "chase her,"—or "get it." Most of them would give to the grocer boy the apple he dropped [171], and all would see that he had it again if he were taking the apples to the minister's, priest's, or rabbi's house [172].

If a boy wanted them to steal apples [173] they generally gave answers filled with real feeling, such as,—“No, you’ll be put in prison if you steal apples.” “No, they’ll catch us.” “No, I don’t want to be no crook.” Curiously enough some of the majority who declared they would not touch a big dish of candy when they were left alone after promising not to touch it [174] took pennies which the experimenter had left about to see if they would steal while she was out of the room. When a boy “stole a pocketbook and” they were asked about it [175], most of them would tattle on him.

The verbal responses to these situations were on the whole reasonable. One could usually understand why certain unusual ones were made. It does not follow necessarily that all these individuals would live up in real situations to the principles embodied in these remarks. Nor do the figures in the table for items 166-175 imply that 6-year-olds are more moral, ethical, unmoral, or unethical than other aged individuals. It does not generalize in regard to the morality of the feeble-minded. As Thorndike says, “Morality is more susceptible than intellect to educational influences.” One may draw one’s own conclusions.

There was considerable variation in the abilities of the individuals to count. The majority could count up to 20 [176], a few to 50 [177] and still fewer to 100 [178].

“Now we will play store—here are 10 cents,” giving the child 10 pennies, “and I have some postage stamps to sell. How many 2-cent stamps can you buy for 10 cents?” [183]. “Here are 5 cents and you want three 1-cent stamps. Pay me. How many pennies are left?” [186]. Of situations presented change for the one last mentioned was most often correct. To find the number of cents left from buying one 2-cent stamp when one had 5 cents [184], three 2-cent stamps having 10 cents [185], three 2-cent and two 1-cent stamps with 10 cents [187] was too difficult for most of the individuals. The failures seemed due largely to responding to a part of the situation, not to the whole. “Three 2-cent stamps” seemed to mean 3 stamps, and so 3 pennies were paid. The fact that many knew the arithmetical combinations seemed to play a relatively small part.

The children were asked to “give me half of this paper”

[188], "half of this piece of string," "and half of 12 blocks," [10, 8, 6, 4, and 2]. Few mistakes were made. In the case of the blocks the effort seemed to be to get as many in one hand as the other,—or to count off as many on one side as the other. Finding $1/3$ and $1/4$ was quite beyond every individual.

In the matter of Time they knew which part of the day it was morning, afternoon, or evening [198] and which it was upon arising [199].

Orientation as to time [201] seems poor when one looks at the sum total of successes, but the failures were in the cases of the individuals at Letchworth who did not know when they went to the Village. The stimulus acted upon very different forms of association. They knew where they live [202] or where they lived before going to Letchworth [203], and the name of the town or city [204] and building [205]. They understood the positions of in front [206, 213], back of [207, 214], side of [208], on [210], in [211], out [212], inside [215], and outside [216].

All the individuals were able to tell something about the five pictures shown [230]. They are discussed later.

CHAPTER IV

SIX AND SEVEN YEARS MENTAL AGE

So far the results have been presented on the basis of whether 6- and 7-year-olds by mental age succeeded or failed to respond creditably to a series of items. However, there are differences in their responses. The differences are not marked between adjacent groups on the basis of intelligence quotient. The differences are so gradual that it is only by going out to the extremes that decided differences are observable.

The responses of the superior children differ in some minor respects from those of the normal group, and the normal, in turn, from the group above or below. There is no real break, however. One group merges into another.

The treatment of the results is simpler when the individuals are thought of in these groups, corresponding to the three parts of the study. From Table IV it is evident that there are some individuals in the first group (Letchworth) of over 70 I.Q., in the second group (Public School 43) who are below and above normal, and some in the superior group (Horace Mann) who are normal or average. The separations seem justified, however, because of the differences of environment in each group. The Letchworth children of 71-110 I.Q. had a relatively less stimulating environment than the children of Public School 43,—and similarly in the other groupings by I.Q.

THE SUPERIOR CHILD

The study of very young children was to complete the range of the abilities of the 6- and 7-year-old. Unfortunately but little time was given to it. The results therefore must be thought of in the light of a bird's eye view which may have touched only the conspicuous and not the truly representative points.

Forty children of the Horace Mann Kindergarten were given the Stanford Revision and the Herring Revision of the Binet-Simon test. Only 4 were 6 years old or over. On the basis of

TABLE XI

NUMBER OUT OF TEN DIFFERENT INDIVIDUALS, 6 YEARS MENTAL AGE,
HORACE MANN KINDERGARTEN, UNABLE TO RESPOND CREDITABLY
TO ITEMS LISTED

Item	Chron. Age -6	T(K)	I.Q. 91-	111-	121-	131-	141-	T(K)
2	10	10	2	2	4	1	1	10
7	10	10	4	4	0	1	1	10
24	10	10	3	3	2	1	1	10
25	10	10	2	3	3	1	1	10
44	3	3	0	0	2	1	0	3
62	9	9	3	3	0	3	0	9
84	7	8	0	1	6	1	0	9
119	10	10	4	2	2	1	1	10
132	7	7	0	1	3	2	1	7
152	6	6	2	2	2	0	0	6
153	3	10	2	2	4	1	1	10
206	10	10	4	2	2	1	1	10

intelligence quotient groups, there were 9 from 91-110, 9 from 111-120, 12 from 121-130, 8 from 131-140, and 2 from 141-.

It cannot be claimed that the inventory was tried out on them. Items from various parts were given them as a part of the general conversation between the child and the examiner. No attempt was made to ask questions that seemed to depend largely upon experience or in which the other children had failed. It was all most casual and, as can be inferred, covered but little time.

These items were asked: 1-7, 17-26, 37, 43-54, 69-101, 103, 105, 109, 119, 121, 130-136, 153, 201-5, 219. So few children were given these items that except for items 1-3, and 201-205 there are not more than ten individuals who were asked the same question. However, every child was asked some of the questions. Such small numbers, therefore, do not permit any just comparison.

In the items listed there are no real differences in the general responses from those given to the other 512 individuals. They answered about the same items. They did not know where to buy beer [84], and were unable to repeat any of the related words [119]. The word jealous was not understood

by them, so they could not tell what they were jealous of [7].

The real differences appear to be in the quality of the responses. In practically every case where a number of things was to be given their single responses contained more elements. For example, they gave 5 parts of the body and face while the others gave at least two. They also named more different pieces of furniture [45-54]. Tables X and XI present these facts. One child pointed correctly to North, South, East, and West [220], and responded correctly when asked, "What is opposite South?" etc., or, "What is the other way from South?"

THE NORMAL CHILD

The things known by individuals of 6 and 7 years mental age in Chapter III, section 5, are representative of the average. Most of these things 6- and 7-year-olds are generally assumed to know. What they do not know may be a real surprise. One way of indicating what the normal child knows is by comparing the extremes, the dull and the bright.

A little more than what the dull can do and a little less than what the brilliant can do probably represents what the average can do.

THE SUBNORMAL CHILD

Glancing through Table IX one finds many more failures in the group of 6-10. This is largely due to greater numbers of individuals. Speaking relatively they answer about the same questions as the other groups. The superiority, however, comes in the group from 16-20.

Their responses frequently lacked point and completion. They were meager. To many of the individuals any answer was better than none. Superficiality apparently did not concern them. Many failures were due to inability to comprehend the item, apparently limited capacity for voluntary effort, and sustained interest. Some answered certain questions, others did not. The fact, however, that some could do so makes it apparent that the items were not too difficult for all of them. It also indicates that there were certain individual differences in the thought processes. As Dr. Ordahl says, "It is quite possible that persons may be capable of exercising a relatively high degree of control of the associative processes and yet be sufficiently defective in other ways to make them feeble-minded."

DIFFERENCES

On the chronological age basis the differences seem due largely to extra years of living at a certain rate. The superior child named, for example, more things to wear [103] and more to eat [105] than the others. In the added years the feeble-minded had not gained similarly because of incapacity to profit from the environment as fully as these little children had in a very few years.

Years of living had resulted in some of the individuals being able to count to 100 and over.

A difference of interest was evidenced in five pictures [230] shown the first two groups. They appeared in back numbers of *Life*. I, "The Girl He Left Behind Him," shows a stork dropping a baby girl as he flies over the chimney. II, "The Watch Dog. Watch his tail. At the approach of any member of the family it will wag." In the terms of the individuals "the girl and her fellar are making love and they put the dog at the door to let them know when her father was coming." III, "Years of Discretion." It is almost twelve o'clock, and the irate father is advancing into the room where his daughter and her caller are sitting on the divan holding hands. The mother is trying to restrain the father with her hand upon his arm, and her finger upon her lips. IV, "Three Hundred Years and No Change in Method," shows a Pilgrim kissing his fair maid. V, "The Absent-Minded Stork." The bird is leaving a colored baby at a door, to the consternation of the butler. The pictures with the babies appealed largely to the younger individuals. The older boys and girls appeared to take real delight in the sentimental ones. The younger ones said, "Mother and Father are kissing," while the older ones said, "They are lovers. They are spooning." It hardly seems that these differences are due to anything more than chronological or biological differences.

No mention has been made of the various activities which the older ones had learned, such as bed-making, sweeping, and cleaning. If the normal or superior children attempted to carry on any of these activities for as long a time as the older individuals, they, in all probability, would be forced to stop long before from sheer physical inability, if lack of interest in the

occupation had not already terminated it. During the war an eighteen-year-old feeble-minded boy with 7 years mentality earned \$25.00 a week scraping barnacles off a dry-docked warship in Charlestown Navy Yard. The Society for the Prevention of Cruelty to Children would interfere, even if it were possible for a superior child of 5 years to carry on such labor.

The things in which the feeble-minded generally excel (the actual doing of things), were not touched in the inventory. Performance tests were given, but the results were poor. These individuals might have kept up the performance if it was largely repetitive—once they were started. The trouble was they were unable to get started.

In the inventory there were few occasions for use of the pencil. The lines in the geometric forms for the most part were drawn more evenly by the older individuals. Control and co-ordination were better, but there was no other real advantage due to age alone. The drawings of the boy, girl, dog, man, house, wagon, and barn showed marked differences in content. The feeble-minded individual put on or in the things he had learned through experience belonged to the thing. The normal or superior child did not present parts that were invisible. That is, the drawings of the feeble-minded were evidences of inability to subordinate the non-essentials or to disregard the irrelevant. Dr. Hollingworth says in *The Psychology of Sub-normal Children*, page 181:

Mental age, not chronological age, is the basis of the learning curve. Ability to profit by instruction depends not on how long the individual has been in existence, but on the complexity and sensitivity of his nervous system.

In children the nervous system becomes sensitive to a greater number of situations, as it grows from year to year. This is true of all children, but the rate of growth and the ultimate limits of growth vary greatly from individual to individual. The kind and number of habits an individual can form at any given time are conditioned by the stage of mental growth which he has then reached.

To the superficial reader it might appear that individuals of low I.Q. know as much or more than those of high I.Q. That is, he might say that an imbecile knows as much as a superior child. The imbecile of 6 years of living is relatively younger in mental age than the superior child of this study is in chrono-

logical years. He would be leaving out of account the difference in chronological age, which in its ratio to the mental age indicates the intelligence quotient. The study of individuals of high I.Q. was so incomplete that a general statement is not justified, but they appear to know more than those of low I.Q. They at least give more evidences of clear thinking, know whether they know or understand a thing—and are not satisfied in giving chance answers. They appeared to prefer saying, “I don’t know,” than to answering in what might have seemed an absurd manner.

Further discussion of the differences due to the intelligence quotient would be redundant, because the facts are shown in the comparison by chronological ages. The I.Q. is in reverse proportion to that age, so that one merely has to use the word highest for youngest, and lowest for oldest in re-reading the discussion of differences due to chronological age.

There are also differences due to social and economic status. In naming vegetables the superior children named several unmentioned by the other groups. In the case of the Public School 43 children, no real reason can be found in lack of opportunities to see many kinds of vegetables. They probably go to the store more often and can see the vegetables. They probably do not buy them, or do not eat them often, and possibly have had little actual experience with them. The feeble-minded had difficulty in thinking of kinds of cloth. They named floor-cloth, dish-cloth and rags. The superior children gave silk, wool, linen, and cotton. In fact, in whatever field of knowledge the superior child knew anything he usually knew it better than the others. The superior children handled their words better and used more relative clauses.

The lower the economic status of the family the more familiar the children were with pieces of money. The added years of living may have something to do with the situation, but the emotional setting of money is quite different in the poor child and in the one well provided for.

The degree of initiative seemed fairly proportionate to the social status. The relative aggressiveness in the kindergarten child and the submission in the Public School 43 child appeared from time to time. Some of the kindergarten children asked

why the questions were given, or why they had to do them. The feeble-minded children sought eagerly to do them, and never showed any impatience at having to do them.

Richness and fullness of association appeared closely related to social status. Nevertheless, ability to profit from an environment abounding in delightful stimuli was the prerequisite.

CHAPTER V

DISCUSSION OF FINDINGS

GROUPS OF ITEMS THAT CORRELATE BEST WITH MENTAL AGE

It is difficult to state just which items were responded to creditably purely on the basis of mental age. Many of them doubtless can be answered by individuals of somewhat lower mental ages. The fact that there was a negligible difference in the responses of individuals of 6 years to 7, and those from 7 to 8 shows that the same questions were answered by 6- and 7-year-olds.

Then, again, the fact that they failed in certain items does not mean that individuals of 8 years mental age would succeed. Many of these items, one would suppose, would be known after 20 years of living even at a low intelligence quotient rate. If they do not depend entirely upon environment or "exposure," they must depend, to a certain extent, upon native ability. The items which involve abstractions are beyond the capacities of the six-year-old, and the seven-year-old, too.

No general statement can be given of just which groups of items correlate best with mental age. Items which offer opportunities for varying rates of response (the number per unit of time) may go along with mental growth. An individual over 7 years mental age probably has better organized associations and could therefore give more responses in a given period of time. No evidence is offered as proof of this hypothesis.

COMPARISON OF EXTREMES OF THE DISTRIBUTION OF CHILDREN STUDIED

As has been evident from all the material presented, the individuals do not fall into distinct groups by themselves. That is,—the results from the children of 6 to 11 years are not so different at the end of the tenth year as to permit one to say the 10-year-olds are quite unlike the 11-year-olds. There are

progressive changes in the character of the responses, but not decided breaks. The presentation of the findings according to age and I.Q. groups was merely for convenience, and represents the average of the group, not one individual of 6 years, or one of 7 years, or one of 10 years.

However, taking each unit of individuals studied, in Letchworth, Public School 43, and Horce Mann Kindergarten, differences are evident and in many cases marked. They will not necessarily be true of all such groups of feeble-minded, normal, and superior individuals, and yet there is a strong probability that they would.

So far brief mention has been made of the findings from the superior children. It appears apropos to include them in a comparison of the extremes of the distribution of the individuals experimented upon.

Although there are differences of varying degrees between the chronological age groups and between the I.Q. groups, the greatest differences, of course, are between the extremes in each respect.

To the casual observer one conspicuous difference was in attitude. At Letchworth the children were eager, and anxious to "play the games." The younger children would ask at breakfast time if they might come to the experimenter during the day. Giving an indefinite answer rather than a promise often resulted throughout the day in the appearance at the door of the experimenting room of one child after another for "work" or "play." They considered the whole performance a real treat. The boys and girls of ten and twelve found it a most satisfactory method of "showing off." It was definitely understood by the girls and boys who were hoping to go out on parole and emphasized emphatically by them and by the matrons in charge of the buildings that none could leave the institution without having a "brain test." Otherwise "how would the doctors know whether they knew enough to go out?" They were willing to be studied any hour of the day, from half-past seven in the morning until eight o'clock at night, and frequently were disappointed when they were told they had worked long enough for one day. In brief, the attitude of these individuals was definitely eager and cooperative.

At Public School 43 the children were inclined to be excited over the testing. When one child was taken from the class room others wanted to come, and after school hours wild tales were scattered about the "games." It seemed as though the children had been asked so many questions that their memories of them were confused, and imagination lent color to their description of what "she tells you to do." The children were eager, but not in just the same way as those at Letchworth. The former had many more sources of excitement. It was more important to them at three o'clock to run home and play with the other boys and girls than it was for the children in the latter case to play baseball or some other game that might take place any or every day. These children (the normal group) fatigued much sooner, and their interest lagged. The passing of classes suggested time to go home or at least time to move on. However, the children expressed so much pleasure in doing the bits of the experiment that some of the class-room teachers utilized "going up to be tested" as a reward for "busyness" in the lessons. The attitude displayed may well represent that of normal children who have had only pleasant associations in connection with testing, who recognize familiar elements in the material or the performance, and who also have an opportunity to show how well they can do certain things.

The Horace Mann Kindergarten children were also very happy in doing the work. When they had been in for one test they had an idea that was the end of it. When told there were new things for them to do or see they came very willingly. In fact, a number of children would flock in together into the room adjoining the schoolroom and all wanted to see all the new things at once. The eagerness here was immediate, intense, and of short duration. There was a fascination about the things to see or to do, but the call of the group, or of the hammers, or of the piano,—or even of a sudden hush tended to be more compelling. Shorter work periods or more rapid fatigue also dampened the interest temporarily. The following day, however, most of the children were anxious to find out what was new. Some of them were so absorbed in activities of their own, such as drawing or painting a picture, that they felt their work was more important and that the questions asked were silly.

In truth their cosmos was an intense one while in existence.

In summing up the attitude of the distribution as a whole it was evident that the experiment was pleasing to the individuals in varying amounts dependent upon immediate or remote interests and fatiguability. Although the oldest individual and the youngest individual did not necessarily represent the greatest and the least interest respectively, the periods of interest generally decreased with increasing chronological age.

Differences in rate of response lend themselves to objective treatment. Data were obtained on rate of responses in various performance tests given to the feeble-minded group, but few of these were given to the other two groups. The only instances where time was taken specifically into consideration were in the free association test (3 minutes), and a maximum of one minute allowed in which to name parts of the body, the face, etc. [Items 9-18]. Here rate was obtainable. In each group there were individuals who responded slowly, moderately, and rapidly. Some presented physical manifestations of great desire and purpose, but were incapable of producing a proper verbal response. The feeble-minded individuals frequently answered immediately, and exhausted their resources of associated ideas very soon. For the most part they gave some answer rather than none. The typical responses of the normal children were, "We have not had that yet," "I'll know that next week," or "We don't do that in the first grade." Under these circumstances rate must be defined exactly,—as to whether it means number of responses or number of correct responses per unit of time. Then again it is a question of value. How much more valuable is a certain number of irrelevant or pertinent responses than an acknowledgment of ignorance? The superior children in general either said they did not know, or paused and then replied. Some responded as though "Stop and think" were being practiced. This delay in response left fewer seconds for performance so that perhaps some could have given more responses in a longer period. A majority of the individuals usually indicated when the supply of responses to a particular item was exhausted. Maturity also seemed to affect the amount per unit of time. A general statement as to marked differences in rate between the feeble-minded and

the normal and the normal and the superior cannot be justified in the findings of this study. Where the responses depended largely upon maturity, actual years of living, or unusually rich environment, differences were on the basis of chronological age.

The differences in associations are likewise marked at the extremes. Some of the superior children appeared already to have established certain good habits of thinking. Many of the older (Letchworth) individuals might be called "scatter-brains," but not to the extent of diagnosed mental disorder. In the case of the latter it seemed as though so many stimuli were presented to a limited receiving station that only a certain number of connections could be made and those of course were the most familiar. Many of the younger feeble-minded children were simply unable to make certain connections. They were bewildered and lost.

As a result of living a greater number of years one might look for better or more efficient systems of associations on the part of the older individuals of the feeble-minded group. There have been more years for learning to inhibit certain distracting impulses when one had to do a certain thing. There were more years of responding to "Pay attention!" Considering the fact that most of the occupations of feeble-minded individuals involve responses of the brain stem connections and necessitate relatively little cortical activity, the associative systems probably are established in these large physical activity relations. They function specifically, not generally. The actual operation of the thought processes may have benefited very little by the extra years of life. In all probability living at the rate of an intelligence quotient of .70, .50, or even lower must involve quite different adaptations or adjustments from living at the rate of 1.10, 1.20 or 1.40. Greater chronological age may possibly be accompanied by accumulations of information and avoirdupois, but after a certain age man cannot add a cubit to his stature. It would seem that this applies in the matter of mental age. The added years of chronological life do not seem to develop relatively or proportionately the mental machinery. As Thorndike says in *Notes on Child Study*, page 88, "The degree to which anyone has his associations grouped into useful systems, and the degree to which when thinking he criticises

the ideas that come up, selecting only those which fit, are important measures of his intellectual efficiency."

Differences exist between the extremes in respect to funds of general information. There are certain subjects with which young children have no experience, and do not have until they are older chronologically or physically. The younger children (the superior children) seem to have richer associations in regard to matters within their experience, and utilize them discretely. The feeble-minded individuals appeared to have accumulated scattered bits of information and frequently used them in an absurd manner. It was apparent that the former had a wider workable fund of information. The fact that they live in superior homes in the midst of wide fields of experience suggests a greater opportunity for becoming the possessor of a large fund of knowledge. But if one element has no affinity for another, being bathed in a sea of that element will not produce chemical union. The feeble-minded boy at Waverly who devoted himself to Dr. Fernald's encyclopedia would respond upon the presentation of a familiar word (as stimulus) by repeating what came after that word in the text. Once started he would go on and on. He had a huge fund of knowledge, but was unable to understand it or utilize it in any other way than by satisfying the instincts of vocalization, attention-and approval-getting.

The numbers of individuals at the extremes are not comparable. It therefore would not be reliable to state that one extreme has a larger fund of knowledge. The probability is that the superior individuals excel in the fund in some particular field, which is not dependent necessarily upon physiological changes. In any case they excel in the use of the information they possess.

No actual count was kept of the number of different words used by the three groups. In general, the working vocabulary of the superior children was larger than that of any group of the feeble-minded individuals. From one's own experience one knows that some people use words they do not understand. Children love to experiment with a new word. It usually attracts attention or is satisfying in some other respect. Feeble-minded individuals have difficulty in securing approval of their

efforts. Any initiative that results in failure frequently arouses scorn and disapproval in others. If they try out a new word without success they may be laughed at or called crazy chiefly because of past incongruous acts. As one girl said, "Oh! she uses big words and nobody knows what she says. She don't know herself." These individuals do not make enough of a success in using new words to continue doing so. The same old words can carry them along day after day. As a matter of fact most of them are not interested in words. They prefer to do things or make things.

Great differences in hand-and-eye coordination came out in the group tests between the responses of the normal 6-year-olds and the feeble-minded individuals from 10-20 years. The younger children had difficulty (1) in directing the pencil point to the proper object or space, if it were small, (2) in finding the place when they looked from the papers or took the hand away, and (3) in making numerals or other simple symbols. They were slow because they had not had practice in making these muscular adaptations and especially because motor control is as largely a function of physical maturity. The fumbings with the pencil were due to this. It was quite true,—“We haven't had that yet. We'll have it next week.” Their school-room habits had not been established.

This lack of coordination seemed in no case due to physical defect in the case of the normal children. A few of the Letchworth cases were hemiplegic, but the usable members gave little evidence of such incoordination as would affect performance.

One therefore may assume safely that the motor difficulties of the first graders, which were in a less degree difficulties of the younger feeble-minded children, were for the most part absent in the case of the older individuals.

The experimenter did not ask the individuals what they were interested in. It was not really necessary. Their acts spoke loudly enough. The superior children had things they wanted to do or to make, and were anxious to accomplish the particular thing. One child told the examiner that the questions asked were all right, but he did not like to have his painting interrupted in that way. They all gave evidences of wanting to do

or make. There were, of course, preferences as to what to do and what to make.

The interests of the younger group of Letchworth children also centered in things to do and things to make. This may account in a measure for their enjoyment of the "games" as they called what the experimenter asked them to do. They were familiar with a bag full of toys or things to do things with. They did not know enough to utilize the materials their usual environment offered. The trash pile was something of an attraction, but failure to find anything had dampened interest in that source. The children from 11 to 15 were interested in activities that called for strenuous physical activity. They liked to move about. Some of their interests centered in appetites. One boy talked and talked of things to eat, especially of sweets. As it happened he was an endocrin case, and had a high tolerance of sugar. The only thing another boy showed interest in was "going home." The oldest group for the most part was interested in sitting about, telling tales of life in other institutions, or repeating what others had said. Many of them were anxious to leave the institution, but the interest was not all-absorbing. If it were, no one realized it until after the child had disappeared from the institution unceremoniously after dark.

In brief the interests at the upper end of the distribution were in activity, and demonstrated initiative. At the lower end they were the reverse: the individuals were interested in just "sitting," and were submissive and meekly obedient.

It is quite possible that the instinctive bases for these interests play an all-important part. The child is interested in handling things, doing something to see what will happen, moving about, and exploring. The child of ten and twelve enjoys these, too, and also seeks a broader environment for his activities. He wants to play out in the field. This of course does not imply that these activities are representative solely of this age nor that children of this age enjoy only these. They are at least conspicuous. The older individuals seemed to take little interest in anything. As a matter of fact, the appearance of a man within calling distance immediately produced a change among the older girls. They were all interest. Interest in sex appeared

as keen as interest in food to a hungry man. The older boys did not manifest a corresponding eagerness. Some of them called the teachers their "best girls," but their thoughts did not seem to be constantly upon such matters. The responses made by the older girls to the pictures shown gave evidence of enjoyment in the sentimental or romantic ones.

In the case of the feeble-minded while they were doing things certain instincts were satisfied in some measure. When they had nothing to do other instincts demanded satisfaction. Healthy individuals, well nourished and strong, with little purpose in life are rather at the mercy of certain instincts. In fact, it is evident that one set appears relatively stronger in the youngest chronological age period, another in the older group, and so on. Chronological, physiological and mental ages do not always travel in unison. Where the first two outstrip the third, physiological and biological demands seem too great for the third to direct or control.

An effort was made to find out how 6- and 7-year-olds respond in regard to the exercise of a particular instinct,—the instinct of acquisition.

At Letchworth ten pennies were placed about the room before the child came in for the first part of the inventory. One was placed in the chair he would use, two on the rug near the chair, one under the lower left-hand corner of the blotter on the table with just the edge showing, and two in a purse which was partly hidden under a pile of books, but not in the examiner's line of vision. Four others were scattered carelessly behind the books in such locations that the child might easily think no one had noticed or could see them. The position of the pennies when the boys were working was really "vicious" and more propitious for stealing than in the case of the girls. At the end of half an hour the examiner left the room for a minute or two. When it was about time for the child to stop work the examiner said, "Now we will play store. Let me see, I have some pennies. Have you seen them? I should have ten." A search was made by both the examiner and child for the ten.

Fifty-three boys took from one to five pennies and usually from the four that were out of sight and the one under the blotter. The younger boys gave up the pennies when accused

for some time, and either cried or said they did not mean to. The older boys said the pennies were theirs, that they had them when they came, that someone gave them to them, or that someone put them in their pockets. When the lying was most strenuous the pennies were at the bottom of the pockets, in the shoes, or in the lining of the coat! Twelve of the younger girls took one penny each. Although they denied taking them they gave them up and cried. The arrangement of the pennies for the girls could not be just the same as for the boys because they were tested in the reception room of the dormitory, while this particular experiment with the boys was carried on generally in the head teacher's office in the school. However, books were arranged and the pennies placed as nearly in similar positions as possible.

As the pennies were obtained from the children before they left the room none of them had any to display and no one reported overhearing the children talk about them. However, for a period of two months no pennies were taken. It is possible that some word went around that the pennies were merely there to make one steal. In the case of the girls who knew that the reception room is cleaned every day and nothing is left but chairs, tables, and the rug, the assumption probably was that the pennies must belong to the examiner. Twenty-nine individuals picked up and gave the experimenter one or more pennies, remarking that someone had left them, dropped them, or asked if they belonged to the examiner. One boy asked if he might have the pennies because he found them. The older individuals usually paid no attention to them, although they could not help seeing them. There was evidence of suspicion on their part.

These findings in no way insinuate that the feeble-minded steal nor that more feeble-minded boys than girls steal. It merely shows that in the cases of these individuals the younger seemed less able to respond by inhibition to "pennies and nobody is looking" than the older ones. This may or may not mean that the instinct was acting more strongly. It appears that the checks were strong in the case of the older individuals and weak in the younger ones.

The experiment was not tried out in exactly this form at

Public School 43. The pennies were placed about in similar manner, but occasionally the examiner forgot to leave the room. No pennies were taken. Some of the children handled them or pushed them out of sight. Some gave evidences of wishing to have them. Some picked them up, hunted for more, and gave them to the examiner. There was no lack of interest in the ten pennies. The instinct of acquisition was evidently operating, but did not satisfy its want.

The Kindergarten children played with the pennies, but showed no particular interest in having them. One child remarked that he had had the pennies,—referring to his being asked to count [13] pennies during the Stanford examination. With these children the instinct of manipulation seemed stronger than that of acquisition. There is a possibility that environment affects one's interest in pennies.

In general, these results have too many selective factors to regard them as real evidence of the strength of the instinct of acquisition in the case of 6-year-olds of varying chronological ages. The situation presented was artificial.

In a real life situation of this type other instincts may be stronger. Mr. Cleveland Moffett's experiment in Honesty showed that in a period of six weeks 60 of the 100 individuals experimented upon returned the money sent, 40 failed to return it, and that 10 more women returned it than men. The fact that a number failed to return it does not mean absolutely that they were dishonest, unless, presuming that nothing could have prevented the money from reaching its destination once it was started on the way, we take a Freudian attitude.

The real evidence of differences in the relative strength of instincts in those of less than 6 years and those of 16 to 20 years is probably in the interests manifested.

COMPARISON OF FINDINGS FROM THE INVENTORY AND FROM THE SERIES OF INTELLIGENCE TESTS

The inventory of the minds of the individuals of 6- and 7-years mental age was given to find out what they know and can do. Correct responses to some of the items require at least certain amounts of intelligence. Many seem to depend largely upon maturity. Still others are dependent upon both. To

decide absolutely in such cases would be difficult. If the comparison is made between material in the inventory which is similar to that in any of the intelligence tests used, the conclusions drawn ought to be more reliable on the basis of classification—as to whether success in it is dependent upon intelligence or maturity or both.

Take, for example, the picture test. Five pictures, two of which were in colors, were shown to the individuals one at a time. In only a very few were objects enumerated,—the pictures were described. In some cases responses were almost equivalent to interpretation. Many of these individuals, particularly the younger feeble-minded children and the normal, had merely enumerated the details of the pictures presented for test VII 2 of the Stanford Revision. What made the difference? Was it the selection of subjects which aroused greater interest and produced better results?

The children were asked to count backwards. As Table IX shows, some of the Letchworth individuals could count backwards from 100, 40, 20, and 10. No child of the normal group could count backwards at all. Even the attempt from 5 backwards was unsuccessful. Yet, all these individuals are rated as 6 years mental age.

The free association test [X 6] showed that many of these children, both Letchworth and normal, were able to give at least 20 words in 3 minutes, and some even 30 words.

Still more instances of similarity in the inventory with the material of intelligence tests may be noted, e.g., in the case of the Dearborn Group Tests of Intelligence. In fact, a large number of the various fields represented in the inventory are in picture form in this set of tests. Among them are tests of general information, life situations, memory, form, drawing, picture sequence for a story, number, and various performances. High correlations have been obtained from these tests. How much would the results be affected when given to feeble-minded individuals from 11 to 20? Would they be measuring intelligence, maturity, or their combination?

A comparison of the separate successes in the Stanford examination given to each of the three groups shows real differences, some of which may have been presupposed from the trend of

the discussion of the findings of this study. Some of the youngest children do not know the names of the coins [VI 5], were unable to repeat 16-18 syllables [VI 6], did not describe the pictures [VII 2], and could not tie a bow knot [VII 4]. Some of these tests are beyond the 6 year group but were passed frequently by many of the individuals, especially those over 11 years of age. In fact, the older ones could count backwards [VIII 2], give the date [IX 1] and even arrange the weights correctly [IX 2]. A few gave 60 words in 3 minutes [X 6]. In the vocabulary test [VIII 6] the superior children did relatively better than both groups, the normal children did next best, then the oldest feeble-minded, and so on down the line chronologically. Nevertheless, all are recorded as having about the same mental age.

Such data immediately force upon one's attention the irregularity in abilities of these individuals. It has been assumed from time to time by experimenters in the field of subnormality that the feeble-minded are much more irregular in their abilities than normal individuals. Just how these conclusions were reached is not definitely stated. Some do show how much the subnormal differ from the normal in certain specific respects.

Statements have just been made indicative of irregularity in the abilities of the 6- and 7-year-olds as shown in the Stanford examination. To find out how much it really amounted to, a count was made of the number of year groups between the basal year and that in which no test was passed. Detailed tabulations of Stanford examinations given in several schools permitted distributions of this irregularity. The results are presented in Table XII.

It will be seen that the feeble-minded are not any more irregular in this respect than other groups of children. There is a much larger number of cases in the group of subnormal children (1,000), which makes for greater reliability. As a matter of fact the irregularities appear in the cases of superior children with special language abilities. A child of 7 years 7 months mental age and 138 I.Q. had an irregularity of 7, a number which was not reached by any of the feeble-minded. This, of course, is but one case. The feeble-minded are irregular in certain respects, but they are not so irregular as is generally believed.

TABLE XII

VARIABILITY (IRREGULARITY) IN STANFORD REVISION OF BINET-SIMON INTELLIGENCE EXAMINATIONS, IN RESPECT TO NUMBER OF YEAR GROUPS BETWEEN BASAL AND ALL-MINUS YEARS.

(Explained in the text of page 131)

School	No.	Median	Mean	Sigma	P.E.
Horace Mann Kindergarten	79	3	3.1	.8	.5
Horace Mann Grade I.....	201	3.8	3.9	1.1	.7
Scarboro Grade I.....	14	3.6	3.5	.9	.6
Lincoln Grade I.....	43	3.1	2.9	1.0	.7
P. S. 64 Grade I.....	200	2.9	2.1	.93	.6
P. S. 64 Ungraded	200	2.8	2.9	1.0	.7
Miss Farrell's School Ungraded.....	1000	3	3	.8	.5
Private School X.....	51	3.7	3.9	1.2	.8
Letchworth.....	312	3	3	.91	.6
Public School 43.....	200	3	3	.9	.6
Horace Mann Kindergarten	40	3	3.05	.8	.5

The results obtained in the series of intelligence tests show certain consistent factors. In the language or verbal tests there is not a great difference between the lowest and middle I.Q. group. The upper group, in general, has better language ability and often succeeded through clearer thinking and better expression. The non-language or performance tests produced much higher scores from the feeble-minded than from the normal group. In fact, the scores made by the latter were surprisingly low. However, other experimenters have expressed the same surprise at such results in their own testing. The "doing" alone takes the young children too long. In the learning tests the older individuals had relatively few unfamiliar or unaccustomed muscular adjustments to make, and once the idea was grasped went on rapidly. A long test with much repetition, as in the form board test of the Pressey Primer Scale, was a great source of pleasure to them. The responses in the cancellation test were characteristic of the feeble-minded in general. The crossing out of A's in one line after another was something they could do. They knew it, and as one child said, "I love it!" The normal children had great difficulty in find-

ing the A's, and did not love the test. It doubtless would be almost impossible to obtain scores if the test were given to the superior children. The physical adjustments alone would probably be so great that most of the energy would be spent in making them and not in crossing out the letter. Superior children in their second school year have evidenced great dislike and boredom when given this test, and made very low scores chiefly through lack of interest in such a "stupid," monotonous procedure.

These differences between the groups—shown in the results of the language and non-language tests—are not evident in the amount of overlapping of the 6- and 7-year results. The reactions of so many individuals of greater chronological than mental age in both groups, of 6 and 7 years mental age, produced similarly high scores and thus obliterated much differentiation between the mental age groups. As is shown in Table VIII, the differences between these two age levels are not very marked. Whether they would be, if the chronological range were narrower, is not known. It is difficult to estimate this, even by comparison with Dr. Ordahl's findings given in "Qualitative Differences between Levels of Intelligence in Feeble-Minded Children" (*Journal of Psycho-Asthenics*, 1915), because of the greater average chronological ages in the 6-year and 8-year groups—20.5 and 22.9. And also because the difference in mental growth from 6 to 8 may not be on the same scale as from 6 to 7. It is quite true, as some one has stated, that the child of 6 years has learned relatively more in that number of years than the university student in 6 years of academic pursuit. There surely must be a difference between just 6 years of mental age and just 7, but it is difficult to locate the dividing line exactly.

CONSIDERATION OF REACTIONS APPARENTLY UNTOUCHED BY
MOST MEASURES OF INTELLIGENCE

It may already have been concluded that the effect of experience was taken but little into account in the intelligence tests given. The medians and variability of irregularity of the groups in the case of the Stanford tests give no real indication of this condition. Raw scores certainly do. The individual who passed

the IV-year group, 1 test in V, 1 in VI, 2 in VII, 1 in VIII, and 1 in IX was recorded as having 6 years mental age, just as the individual who passed all the tests in VI group. Surely there can be no justifiable reason for giving to both identical mental ages. Why should not the former, who really stands higher mentally, be given more credit? Should one be penalized for the experience acquired through extra years of life given, though living at a slow rate?

In cases of examinations where mental age equivalents are assigned on the basis of score, higher scores, due in part to greater experience, are taken care of. Yet there is a feeling among some examiners that in the case of the feeble-minded the mental ages thus derived are not what they appear to be. It is very true that they are not, for experience has not been taken into consideration in the arrangement of the parts of the examination, and more ground covered in each test may simply represent speed in the use of the pencil.

With physical and biological changes in individuals come certain changes of fatiguability and interests. The young child with relatively poorly established coordinations of hand and eye may become tired out in hand or eye at the end of a test which has required frequent and numerous physical adjustments. As a result, in the next test he may do poorly. One then assumes, in an off-hand manner, that the test is a difficult one because so many children fail to succeed in it.

In tests for little children there is no occasion for taking into account biological changes. When one gives them to older individuals whose reactions indicate the mental ages of children it seems as though interest must have some effect.

Speaking very generally, not all feeble-minded individuals of 6 or 7 years mental age are interested in making mud pies, playing horsey, or taking care of dolls. It is a question whether tests based on such interests get the response that more mature material might. One difficulty, of course, is to determine the exact amount of maturity to take into consideration. And, after all, it might not be worth the time spent.

IMPLICATIONS FOR THE ARRANGEMENT OF INTELLIGENCE TESTS

The norms of intelligence tests indicate the ability of the average. The 6-year norms, and the 7-year norms are representative

of the accomplishment of children who are that age mentally and chronologically. By comparing the score of an individual with the norms one finds whether he did well or poorly. The tests for children are not arranged to cover a wide chronological basis,—at least supposedly not beyond the age of compulsory school attendance. It is no mark of disparagement, therefore, when “unusual scores” are obtained from children’s tests given to the feeble-minded. Test results probably serve their greatest purpose in the school, where time eventually takes care of excessive over-ageness and children’s tests function adequately. There is no real need for modifying intelligence tests with the provident idea of coming upon very large numbers of feeble-minded individuals in the public schools. However, some justified way of equating the high scores due to experience should be determined. When the evaluating of the results is on the same general plan as in the Stanford Revision evidences of higher abilities in certain respects should receive some distinguishing additional credit.

As is shown in Table IX certain individuals of 6 and 7 years mental age counted backwards from 10-1, 20-1, or 100-1. Some gave 30 words in 3 minutes. Yet no credit would be given for either ability in the Stanford Revision.

It seems more just and reliable to use point values for all successes than to give all or no credit. Distribution of scores for the purpose of finding how each individual stands in relation to the average of that particular group, or to another individual, may give more reliable or more applicable data than a comparison of scores with norms based on scores, and tests given in geographical sections with strong selective factors. Comparison of group findings with those of other groups can be useful.

In arranging tests for young children in particular, certain points should be kept in mind.

1. The material should be of such size and form and so distributed over the surface of the page that there will be a minimum loss of energy through physical adaptations or adjustments.

2. The paper should be devoid of tiny gray or black spots. It has been observed that certain errors in dot design tests were

due to the presence of imperfections in the paper to which the child responded as he did to other "little black things that I must do something to."

3. The order of tests should guard against continuous repetition of the same muscular coordinations.

4. There should be enough tests for reliable measuring. Many of the same type at one sitting would be fatiguing. Parallel series take care of fatigue and also increase the reliability.

IMPLICATIONS FOR CLASSROOM WORK

The quotation from *The Contents of Children's Minds on Entering School*, given on page 12 of this study, presents an implication for class-room work which ought to come from every study of this type concerning children. They, children, should be given every opportunity for experience with concrete material, whether it is the making of a bead from clay or wading up a brooklet to get the "feel" of flowing water. The more restricted the environment of the child of the average family the greater should be the effort to provide him with stimulating surroundings in the school. It is not assumed that any one would expose the offsprings of four generations of "crime, alcoholism, illegitimacy, prostitution, unemployment, and pauperism," to a collection of cloisonne vases, a peep at the goldenrod flowerets under the microscope, Schubert's "Unfinished Symphony," or a trip to an aerial radio station.

The handling of material and the doing of things normally produces questions of how and why. The "insatiable curiosity of the Elephant's Child" may be irritating to grown-ups who believe children should be seen and not heard, but healthy activity of the instincts of curiosity and exploration, when thwarted, may seek satisfaction in less desirable ways. Children's questions should be answered. It is wiser to redirect the force of a river than to wait for it to burst the dam. The answers should be in terms which the child can understand and can use himself with other individuals without making him appear "odd" or "different." Telling a child that a triangle is a tent or that rising dough is enchanted may be wasteful of his energy. If he meekly accepts what you say, some day he may wonder why people laugh when he uses those

particular terms. If he questions such answers, it may be that the child is wiser than the man.

Public school classes for mentally deficient children do, on the average, second grade work. A large number of the children, however, are only capable of first grade lessons. Various curricula have been worked out with great care on the part of particular teachers and directors. Few of these function satisfactorily when carried out in similar classes, according to letter. The program for these children must be specific and unique in its suitability to the particular child. It must, therefore, take into account the chronological age as well as the mental age of the child. Subnormals of the same mental age do differ, as can be seen in Tables IX, X, XI. Much more self-respect is likely to be established in a 16-year-old boy of 6 years mentality, if he makes a dog house or a rabbit hutch and displays it before the family, than if he takes home a tiny doll's chair or table. If these "old" children can be taught to make "grown-up" products, though of course of a very simple kind, they will receive legitimate approval from their friends and neighbors, and consequently be much happier.

SUGGESTIONS FOR HOME ACTIVITIES FOR INDIVIDUALS OF 6 AND 7 YEARS MENTAL AGE

One reason why many families are anxious to get rid of adolescent feeble-minded children is because the hours out of school are difficult to take care of. The children have nothing to do, and do not know enough to find anything. Unscrupulous people have been known to take advantage of such situations and have provided activities for them of undesirable sorts. There is no reason why these children should be deprived of play times and work times any more than normal children. Normal boys of 12 are often seen working for grocers after school and on Saturdays. If the subnormal child is given one simple form of task to do,—such as helping the delivery clerk, unpacking boxes, or cleaning, in a store where every one knows that "he is not bright, but can do certain things," is it not better for him to do it than to remain tied to his mother's apron strings or to be pulled along by the impatient hand of

a brother or sister, or to sit on the door step, a willing victim of whatever turns up?

The implication, of course, is that knowing the mental age, one must also consider the chronological age that accompanies it. The feeble-minded individual of 6 years mental age may profitably be given certain specific tasks that exercise a body that is healthy and ready to react, tasks which in themselves will give pleasure because the individual feels sure he can do them. The "leisure" hours will be happier also if he is allowed, encouraged, and urged to carry on certain manual acts which will be satisfying at least to the instincts of manipulation, gregariousness, and attention-getting. The jack-knife, the jig saw, and the loom present dignified, fruitful, and enjoyable situations.

The home activities of the younger feeble-minded, the normal, and superior children are not such problems. For the most part they need not differ essentially. Feeble-minded children of nine and ten years of age usually seek out the company of children of their mental ages. They have more fun with them. They may have to do more running and hauling, but they generally enjoy the attention they attract in so doing. In their homes they endeavor to play the games of these younger children. Their activities do need a certain amount of supervision. From the side of social adaptability for an individual living in a so-called normal environment or community, the more similar the home activities provided for young feeble-minded individuals are to those of normal children the better. When we are in Rome we must do or try to do as the Romans,—otherwise we get into trouble, they laugh at us, or situations arise that make us unhappy. If a young feeble-minded individual is to remain in the family and to go about in the community, there is no just reason for allowing him to appear in public with clothes unbuttoned, or with extra buttonholes at the neck of his sweater and just as many extra buttons at the bottom, or with clothes that are too small or outlandish. He should be encouraged to learn, even in the leisure hours, how to button the sweater correctly,—and with haste. By attaching the proper responses to certain situations he can be taught to present a decent appearance. When proper habits pertaining to street conduct are

established in a feeble-minded individual who makes a fairly good appearance, people in the neighborhood will remark how much brighter he looks. All these little things help the child and his family, too. Attending to them is a real part of the home activities.

Normal and superior children of 6 and 7 years mental age will learn and grow in spite of home activities or their absence.

CHAPTER VI

CONCLUSIONS

THINGS INDIVIDUALS OF 6 AND 7 YEARS MENTAL AGE KNOW

The inventory described in this study was given to 512 individuals. Parts of it were also given to 40 children in the Horace Mann Kindergarten, but the results are so meager that reference will be made to them only when they differ greatly from those of the 512.

a) In this inventory of the minds of individuals of 6 and 7 years mental age it was found that of the items of Personal Information the majority knew their age, birthday, and father's occupation.

b) In the field of General Information they gave names of trees, animals, flowers, fruit, vegetables, meat, work, and cloth. They knew at least one thing birds build their nests with. They named various pieces of furniture that go in the kitchen, parlor, or living-room, bedroom, bathroom, barn, library, cellar, stable and garage.

c) They also could name parts of the body, face, a tree, a house, a cart, an automobile, a store, a bed, a chair, and a book.

d) Of the Life Situations they told the kind of a shop where one could buy milk, meat, bread, fruit, vegetables, beer, shoes, a hat, a suit, an overcoat, medicine, newspapers, postage stamps, coal, writing paper, ice cream, train tickets, candy, wood, and ice. They knew where to get a hair cut. They told things one might ride on, wear, eat, and drink. They could suggest some way in which the policeman helps us. Very few failed to give a real reason for going to school. They knew some place to go when a dog was hurt, and what to use in building him a house. They recognized various types of weather but frequently had difficulty in expressing themselves in this regard. "Cutting an apple pie" was demonstrated quite realistically.

e) The identification of the concrete in picture post cards

was far simpler for them than identifying the abstract. Few succeeded with the latter.

f) The majority were able to give 20 words in 3 minutes.

g) In the Memory Tests it was found that they repeated at least 4 and usually 20 words of a stanza read to them. They recalled at least 3 out of 10 unrelated words, and repeated series of 4 digits. Of 10 objects attractive to children 5 were recalled.

h) In respect to Form they were able to draw a square, circle, and box. They recognized the first two just named, the cross, the sphere, "the ball," and the cube in solids.

i) They could draw a boy, girl, dog, man, horse, wagon, and barn with varying ability depending upon mental capacity rather than upon the physical habits essential to the act of drawing.

j) They gave plausible answers in regard to where babies come from. They knew the origin of milk.

k) They showed comprehension of simple social or moral situations, indicating what was wrong or what was right.

l) Of the Number Relations some of them could count to 20, and others to 50 or 100. They also knew how much change was left from 5 cents after the purchase of three 1-cent stamps.

m) They are well orientated as to time, part of the day, place, and directions such as front, back, side, on, in, out, inside, and outside.

THINGS INDIVIDUALS OF 6 AND 7 YEARS MENTAL AGE DO NOT KNOW

Following the same order we find that

a) Not all knew the meaning of "jealous" and consequently were unable to tell what they get jealous of.

b) They do not know the name of the president, his place of residence, or the previous or first president. They did not know who Abraham Lincoln was, what the United States is, or what a citizen is. They could not tell what the heart does for the body or why it beats. They had vague ideas of how long to cook an egg or a potato. They showed very little familiarity with the names of the months and especially as to when various holidays come. They did not know where the birds go in winter. Very few knew the real phenomena beneath the motion of the street cars, the heat of summer, or night.

g) The auditory memory of nonsense syllables was beyond them.

x) They failed to show a marked preference or consistency in their preference of colors.

h) They were unable to draw or recognize the diamond and triangle. They also failed to identify colored form, and form despite color in the particular situations presented.

g) They were unable to arrange pictures to represent a story.

j) They had vague ideas of human origin, as well as the origin of butter, beer, potatoes, coal, eggs, paper, cotton, leather, and wool.

k) Few gave creditable answers in regard to where they would go if lost.

l) The majority could not count backwards. They failed in situations which required knowledge of at least addition and subtraction of small numbers.

m) They had very limited conceptions of time in the abstract. They did not give evidences of understanding opposite, above, below, the directions of North, South, East and West, nor distances between defined points.

MENTAL AGE VERY SIMILAR BUT NOT IDENTICAL FOR 4 TO 20 YEARS CHRONOLOGICAL AGE

The Stanford Revision of the Binet-Simon Intelligence Examination given at the beginning of the study of each individual showed irregularity in the separate cases of a total 72 months. The older individuals tended to pass more of the tests influenced by mere maturity. This factor—the influence of mere maturity—seems to be the chief point of difference in these individuals of the same mental age but of different chronological age.

As a matter of fact 6 and 7 years mental age is about the same for the various chronological ages. The similarities far outweigh the differences.

GROUP DIFFERENCES

The difference between the responses of adjacent groups was slight, but increased relatively as one approached the extremes of the oldest feeble-minded individual of 6 or 7 years mental age and the youngest superior child.

The non-language tests produced higher scores in the cases of the older individuals, and, in fact, of a majority of the feeble-minded.

There was a marked difference in the attitude of the individuals in the three groups studied. The greatest interest was shown by the 6 to 10 groups at Letchworth and the least by those in the kindergarten.

Rate of response, the amount per unit of time, was greater in the case of the brighter individuals, less with the older feeble-minded, and least with the younger feeble-minded.

The associations of the brighter children were richer and better organized. This was shown from time to time in the irrelevant or obscure answers of some of the feeble-minded, and "I don't know" from the superior children.

It is a question whether the fund of general information of the Letchworth group was greater because of added years of living than of the other two groups. With the ascent in the scale of intelligence quotients the fields are certainly broader. Information which was largely dependent upon biological changes was unfamiliar to the younger children.

In the inventory, whenever manipulation of material was required, the older individuals had fewer adjustments or adaptations to make because of established habits of response in various muscular coordinations, and were at an advantage because of maturity of motor abilities.

Some differences were due to interests and instincts. It was evident also that social or economic status produced certain differences. In brief the differences were chiefly in attitude, rate of response, associations, and hand-and-eye coordinations. It may be concluded that there is greater similarity than difference in the responses of individuals of 6 and 7 years mental age from 4 to 20 years chronological age.

SEX DIFFERENCES

Differences in respect to sex were quite inconspicuous. At least they did not demand attention. The girls at times used words which the boys did not. They were usually the names of feminine wearing apparel. The gist of the boys' answers was more aggressive in tendency than of the girls.

VARIABILITY OF GROUPS

Assuming that variability indicates irregularity, the Letchworth group was no more irregular than the Public School 43 in respect to the Stanford Revision findings. In the findings of the inventory the groups varied less within themselves than the extreme groups. The lowest group varied more than the middle, and too few cases in the upper group permit real comparison of the middle group with the superior. In the doing of things some difference appeared to result largely from greater physical development, strength, and endurance.

EFFECT OF EXPERIENCE

It was evident that the older individuals had profited somewhat in the extra years of living. However the increase in knowledge was not proportionate to the increase in years. They did not profit more because their mechanisms were not capable of doing so. It is assumed that the organization of the associations was changed very little, while in the case of the children of high I.Q., mental development goes on at such a high rate that it seems as though from week to week they are profiting from experience at a greater mental age level.

DIFFERENCES DUE TO INSTINCTS

Among the younger Letchworth children acquisition was particularly strong. They were particularly submissive to the older individuals. The boys and girls of 14 and 16 endeavored to attract the attention of the opposite sex while the older group showed strong interests in such relations. They were much more aggressive.

The Public School 43 children evidenced the same instincts as those just referred to at the beginning of this section,—but the actual results of the inventory show little of it.

The superior children desired to manipulate things and move about. In fact, all evidenced pleasure in gross bodily movements but less effort was initiated with the increase in chronological age. A stronger instinct was necessary to start the drive.

In summing up the findings, the greatest differences in the minds of individuals of 6 and 7 years mental age, and from 4 to 20 years chronological ages, lay in the degree to which the systems of association were organized.

BIBLIOGRAPHY

Books and articles referred to or quoted in the text are designated by an asterisk (*) in front of reference.

- BINET, ALFRED AND SIMON, TH. *The Development of Intelligence in Children*. Trans. by Elizabeth Kite. Vineland, N. J.: The Training School, 1916.
- BINET, ALFRED AND SIMON, TH. *The Intelligence of the Feeble-Minded*. Trans. by Elizabeth Kite. Vineland, N. J.: The Training School, 1916.
- CHAPMAN, J. CROSBY. "An Additional Criticism for the Selections of the Elements of Mental Tests." *Journal of Educational Psychology*. April, 1921, pp. 232-35.
- CHAPMAN, J. CROSBY, AND DALE, A. BARBARA. "A Further Criticism for the Selection of Mental Test Elements." *Journal of Educational Psychology*. May, 1922, pages 267-76.
- DEARBORN, WALTER F. *The Dearborn Group Tests of Intelligence*. Phila: J. B. Lippincott Co., 1920.
- LANGE, K. *Der Vorstellungskreis unser sechsjährigen Kleinen*. Jena Allg. Schul. Zeitung. 1879.
- FERNALD, MABEL R., HAYES, MARY HOLMES STEVENS, DAWLEY, ALMENA. *A Study of Women Delinquents in New York State*. Publications of the Bureau of Social Hygiene. New York Century Co., 1920.
- GARRISON, S. C. Additional Retest by Means of the Stanford Revision of the Binet-Simon Tests. *Journal of Educational Psychology*, May, 1922.
- GOODENOUGH, FLORENCE L. *Drawing as a Test of General Intelligence*. M. A. Thesis. Teachers College, Columbia University, 1921.
- HAGGERTY, M. E. *Group Intelligence Tests*. Yonkers, N. Y.: World Book Co., 1920.
- HALL, G. STANLEY. *Aspects of Child Life and Education*. Boston: Ginn & Co., 1914.
- *HALL, G. STANLEY. *The Contents of Children's Minds on Entering School*. New York: E. L. Kellogg & Co., 1893.
- HEALY, WILLIAM. *The Individual Delinquent*. Boston: Little, Brown & Co., 1920.
- HEALY, WILLIAM. "Pictorial Completion Test II". *Journal of Applied Psychology*, Vol. V, No. 3, (Sept. 1921).
- *HOLLINGWORTH, LETA S. *The Psychology of Subnormal Children*. New York: The Macmillan Co. 1921.
- *HUNTER, F. M. *Oakland Public Schools*. Report of the Superintendent of Schools, 1917-18, Oakland, Cal., 1919.
- *KOHs, S. C. "The Block-Design Tests." *Journal of Experimental Psychology*, Vol. III, No. 5, Oct. 1920, pp. 357-76 (Oct. 1920).

- *KUHLMANN, F. "The Results of Repeated Mental Re-examinations of 639 Feeble-Minded over a Period of 10 years." *Journal of Applied Psychology*, Vol. V, No. 3, Sept., 1921.
- MYERS, GARRY. "Mental Measure." *School and Society*. Sept. 20, 1919, p. 350. May 1921, p. 624.
- *NORSWORTHY, NAOMI. *The Psychology of Mentally Deficient Children* New York: Archives of Psychology, 1906.
- *ORDAHL, L. E., and ORDAHL, G. "Qualitative Difference between Levels of Intelligence in Feeble-Minded Children." *Journal of Psycho-As-thenics*, June, 1915.
- OTIS, A. S. *Group Intelligence Scale*. Yonkers, N. Y.: World Book Co., 1919.
- OTIS, A. S. "Intelligence Tests." *Journal of Educational Psychology*, Vol. IX, pp. 239-61, 333-48. (March 1918).
- *PINTNER, RUDOLF. "A Non-Language Group Intelligence Test." *Journal of Applied Psychology*. Vol. III, Sept., 1919, pp. 199-214. (Sept. 1919).
- PINTNER, RUDOLF. *The Mental Survey*. New York: D. Appleton & Co., 1918.
- PINTNER, RUDOLF. "The Standardization of the Knox Cube Test." *Psychological Review*, Vol. XXII, No. 5, 1915. p.377-401.
- PINTNER, RUDOLPH AND PATERSON, DONALD, G. *A Scale of Performance Tests*. New York: D. Appleton & Co., 1917.
- PORTEUS, S. D. *Porteus Tests The Vineland Revision*. Publications of the Training School at Vineland, N. J. Department of Research. Vine-land, N. J. No. 16, Sept. 1919.
- **Psychological Examining in the United States Army*. Memoirs of the National Academy of Science, Vol. XV. Washington Government Printing Office, 1921.
- SCHMITT, CLARA. "The Standardization of Tests for Defective Children." *Psychological Monographs*. Vol. XIX, No. 3, No. 83, pp. 93-96
- *STERN, WILLIAM. *The Psychological Methods of Testing Intelligence* Trans. by G. M. Whipple. Baltimore: Warwick & York, 1914.
- *STRAYER, GEORGE D. and others. *Report of a Survey of the School System of St. Paul, Minnesota*. St. Paul, 1917.
- *STRAYER, GEORGE D., DIRECTOR: *Baltimore School Survey*, 1920-21.
- TAUSSIG, F. W. *Principles of Economics*. New York: The Macmillan Company, 1915.
- *TERMAN, LEWIS M. *The Intelligence of School Children*. Boston: Hough-ton Mifflin Co., 1919.
- TERMAN, LEWIS M. *The Measurement of Intelligence*. Boston: Houghton Mifflin Co., 1916.
- The Training School Bulletin. *The Department of Research*. The Training School. Vineland, N. J.
- *THORNDIKE, EDWARD L. "A Standardized Group Examination of Intel-ligence Independent of Language." *Journal of Applied Psychology*, Vol. III, Mar. 1919, pp. 13-32.

- THORNDIKE, EDWARD L. *An Introduction to the Theory of Mental and Social Measurements*. Teachers College, Columbia University, New York, 1912.
- *THORNDIKE, EDWARD L. *Educational Psychology*. Vol. I, II, III. Teachers College, Columbia University, 1913.
- *THORNDIKE, EDWARD L. *Notes on Child Study*. New York: Macmillan Co., June, 1903.
- THORNDIKE, EDWARD L. *The Teacher's Word Book*. Teachers College, Columbia University, 1921.
- TYLER, JOHN M. *Growth and Education*. Boston: Houghton Mifflin Co. 1907
- VAN HUG-HELMUTH. "A Study of the Mental Life of Children." *Journal of Applied Psychology*. December, 1921. "Vorstellungskreis der Berliner Kinder beim Eintritt in die Schule." *Jahrbuch*. 1870, pp. 59-77. *Berlin Städtisches*.
- WHIPPLE, GUY M. *Manual of Mental and Physical Tests*. Baltimore: Warwick & York, 1917.
- WOODWORTH, ROBERT S. and WELLS, FREDERIC L. *Association Tests*. Psychological Monographs. Vol. XIII, No. 5, Whole No. 57, 1911.
- YERKES, ROBERT M. AND YOAKUM, CLARENCE S. *Army Mental Tests*. New York: Henry Holt & Co., 1920



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